

Flight Simulator **WORLD**

October/November 2001
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Also This Issue:
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Boeing 737 Real Life Adventure

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Customer Relations
Flight Simulator World
5376 52nd Street SE
Grand Rapids, MI 49512 U.S.A.
E-mail: sales@flightsimworld.com

For UK and European subscribers:

Contact Computing Ltd
PO Box 137
Bicester
Oxfordshire OX6 9JS
England
Phone: 01869 345928
Fax: 01869 345989
E-mail: contact.computing@dial.pipex.com

Submissions:

Address tips, special requests and other correspondence to:

The Editor
Flight Simulator World
5376 52nd Street SE
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E-mail: editor@flightsimulatorworld.com

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Publisher: Amie Lee
Assistant Publisher: Scott Slaughter
Managing Editor: Tim Dickens
Contributing Editors: Doug Horton, Adam Howe, Amie Lee, Phil Paschutine, Al Pelletier, Arturo Weiss, Rod White
DT Publisher: Scott Slaughter
Cover Designer: Matt Ridgway
Fulfillment: Bridget Kirby, Julie Snider

Pilot's Note: This information is not intended for use in actual flying situations. While the information is as realistic as possible, you should not use it for actual flying instruction. *Safe flying!*

From The Editor

Tim Dickens, Managing Editor



Recent world events have been very stressful for flight simmers, perhaps no more than the average Joe walking down the street, except in one important respect. That is, that some circles in the media have focused on flight simulation, speculating that a terrorist can theoretically use it for practice. Practice in committing an unspeakable act of barbarism with an aircraft designed for peaceful purposes.

To be fair, most of the media attention has been directed toward the real-world flight training these terrorists underwent. Moreover, of course, nobody in the media or elsewhere is seriously placing any blame for this horrible act at the feet of these flight instructors. They were just doing their job, and had no way of knowing what evil deeds these people had planned.

In press circles, when a media story just is not catching on with the public, they say: "this story does not have legs." From my perspective, it looks like both the real-world flight training and the PC flight simulation stories simple *do not have legs*.

Although I have emphasized many times that PC flight simulation is not simply a game, any clear thinking person appreciates that flight simulation could only supply these villains with a visual picture of steering an airplane into a building. Nothing in PC simulation would have prepared the terrorists for managing the 757/767 aircraft systems they needed to operate.

Not even with the best flight sim panels available truly simulate "systems management" in glass-cockpit-type aircraft or the total three-dimensional environment of the cockpit, because flight simulation panels are really only *two-dimensional*. We use the term 3-D in computing as a technical term, a way of rendering a 2-D scene to *look like* the real world. Our best panels are only good representations of an aircraft instrument panel, not a duplicate of the entire cockpit.

Doug Horton sent me an e-mail, saying: "The terrorists succeeded because of real flight training at our best flight schools and real full motion simulation - not PC flight simulation. Consider a car bomber in Israel. Any reporter who might suggest that a PC car racing game helped would be laughed out of the newsroom. Real driving lessons, yes. A car racing game, no."

I think Doug hit the nail right on the head. Moreover, I am quite sure the public feels the same way, too. These media stories are based on sheer speculation, since no factual reports are available that these scoundrels used any sort of PC simulation. Citizens of the civilized world are looking for justice and solutions, not speculation and scapegoats.

As flight simmers, we can feel comfortable in what we do for both recreation and/or training. And as citizens of the civilized world it is important that we not let these evil forces change they way we live our lives. We owe it to the people who have sacrificed so much..

Keep the blue on top!



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Does it take much to fly a jet aircraft? See for yourself in this article by Arturo Weiss.

You can also learn the important differences between jet aircraft and piston driven aircraft, how a jet engine works and why jet engines are usually safer than piston engines.

14 Flying Online: Improving The Online Experience

In this issue you learn about the new VATSIM.net organization for online flying and see what online controllers view as the areas in which pilots can help improve their online flying experiences.

We'll also look at the *ServInfo* program for finding detailed information about who's flying online.

20 Instrument Flight Rules

In this issue, Doug Horton describe how he used his flight simulator setup at home to practice many of the required maneuvers for the instrument rating, as well as how he flew his first practice flights with actual instrument clearances and real ATC communications.

25 Commuter Flight In Quebec

This Round Robin adventure takes place in the beautiful Canadian province of Quebec. We're flying for Air Nova and Air Alliance Regional Airline on a routine daily commute between four cities in Quebec.

30 Matt Wagner Interview - Lock On: Modern Air Combat

SSI has always been at the forefront with their Flanker series and are also a name to be reckoned with in the realm of naval warfare and military strategic simulations too boot!



We recently conducted a very in-depth interview with SSI's Matt Wagner, the producer of Lock On: Modern Air Combat (LOMAC), which promises to be one of the most impressive modern military air combat simulations since Falcon 4.0!

About this month's cover

Matt Ridgway has again performed his magic in designing and creating the cover for this month's *Flight Simulator World*.

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NOTAMS: New Products

For those of you who aren't familiar with the term, NOTAMS is an acronym for NOTices to AirMen. The U.S. Government issues NOTAMS regularly.

This issue of *Flight Simulator World* includes our version of NOTAMS — an expanded new products section. It's a regular part of our magazine. The products listed are compiled from press releases and information provided by the respective authors and companies who supply the products. We've taken steps to verify the information with each author or company, but cannot be responsible for inaccurate features, specification or availability dates.

Rome Fiumicino Scenery Atlanta Hartsfield Airport Scenery

For Microsoft Flight Simulator 2000
from SimFlyers Associated

The detailed scenery of Rome Fiumicino Intl Airport includes active docking systems at each terminal gate, static and dynamic aircraft/vehicles, custom 3D objects, and realistic night illumination. Runways and taxiways feature all markings and signs, with realistic lighting. The documentation includes an airport map, and background information about Rome yesterday and today. Atlanta Hartsfield scenery includes buildings, runways, taxiways and airport objects. An active docking system/jetways is included at each gate.



For More Information

Web site: www.simflyers.net/
SRP: 16.50 EUR each (about \$15.00 US).

Microsoft Delays Flight Simulator 2002 Release

Microsoft has released the following statement regarding FS 2002: "Microsoft is shocked and saddened by the horrible tragedies that occurred on September 11th. Our hearts go out to everyone involved in and affected by these attacks. We are focused on doing the right thing out of respect for the victims, our customers, partners and employees. With this in mind, we have decided to postpone releasing Flight Simulator 2002 for distribution. We will announce a new date when it is determined."



Xicat Licenses Janes Titles

Xicat will license the rights to the Janes software titles, previously held by Electronic Arts, to produce titles already in the works.

The first game that will use the Jane's license is *Janes Attack Squadron*, being developed by Mad Doc software. Jane's Attack Squadron is a next generation World War II flight combat simulation for the PC. It allows the player to take control of a number of pivotal battles in the European Theater of Operations, from either the Allied or Axis side.



For More Information

Keep up with the progress on the Janes titles from the Xicat Web Site at www.xicat.com/

X-Plane 6.0 Released

X-Plane users will be able for purchase on November 1, 2001. A demo is also available on the X-Plane website. Version 6.0, and the demo, are for both Windows and Mac users.



For More Information

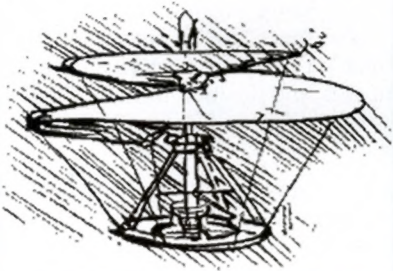
Web site: <http://www.x-plane.com/>

AirplanePDQ

From DaVinci Technologies

AirplanePDQ is a computer aided design tool focused on general aviation, homebuilt, and ultralight type airplanes. This new version offers the capability to export and import aircraft files to and from X-Plane. It has been developed to be intuitive and easy to use by amateur airplane designers. It integrates aircraft sizing and analysis tools with a full-featured computer aided design package so that the designer can focus on the look and layout of the aircraft, while the software performs the detailed analysis calculations.

This new version represents the third major release of AirplanePDQ.



For More Information

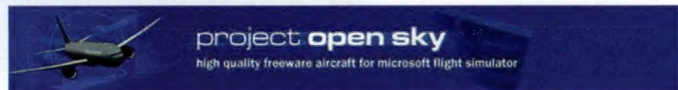
Order from the company web site at www.davincitechnologies.com

SRP: \$99.00

Boeing 777 Series

Aircraft for Microsoft FS 2000 from Project open Sky

The 777 Series represents the latest freeware offering from one of the top aircraft design teams in the field. All models will feature a 40-sided fuselage to achieve a true-to-life shape, tilting main gear structures, accurate antennae placement, pitot tubes, full and accurately timed animation, detailed engines, various vents, lighting, texturing, and in general, great attention to detail. Very accurate flight dynamics tested by real a world pilot.



For More Information

Website: www.avsim.com/posky/home.shtml

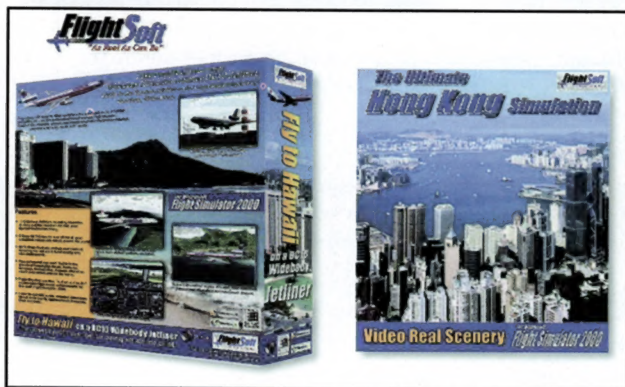
NOTAMS: New Products

New Scenery Titles for FS 2000

From FlightSoft

FlightSoft and Cathay Pacific Airways have released The Ultimate Hong Kong Simulation and Fly to Hawaii, to ship in late September. The Ultimate Hong Kong Simulation includes detailed street level activity, video realistic shops, buildings, and homes, and the famous IGS 13 approach to Hong Kong's Kai Tak Airport. The package comes complete with the Boeing 747-400 and Boeing 777 Jetliners.

Fly To Hawaii features 13 DC10 Wide body Jetliners including Hawaiian Airlines, Photo-realistic cockpit environment, and real sounds from inside and outside the cockpit. Real World ATC audio recorded from actual Hawaiian DC10 flights to Hawaii is incorporated into flights and approaches.



For More Information

Website <http://www.flightsoft.com/>

The Ultimate Hong Kong Simulation SRP: \$39.95

Fly To Hawaii SRP: \$34.95

The advertisement features a large hook on the left with the text 'Hook Up!' in a stylized font. To the right, it says 'with Flight Simulator World On The Web!' and 'Your one stop source for flight simulation and real-world aviation.' Below this, it lists the website 'www.flightsimulatorworld.com' and mentions 'brings online articles, aviation photos, aircraft & scenery tutorials, show reports & events, interviews and much more!'. At the bottom, there is a screenshot of the website's interface with the text 'Flight Simulator World' and 'www.flightsimulatorworld.com' overlaid.

Pamplona 2001

For Microsoft Flight Simulator 2000 from Sim-wings

Pamplona 2001 is shareware scenery for the Spanish city of Pamplona. The scenery includes a very high detailed and realistic airport, the town of Pamplona with a number of local landmarks rendered as custom 3D objects.



For More Information

Web site: http://www.sim-wings.de/homepage/home_uk.htm

SRP: EUR 13.00 (about \$12.00 US)

TS Design Studio

Train Simulator Add-ons From Abacus

For those interested in add-ons for Microsoft Train Simulator, Abacus has released a number of titles, including *TS Design Studio* a very capable software package that automates the conversion of your designs into ready to use trains, so you don't have to manually launch the converters.

This new software finds its roots in FS Design Studio the industry standard for making virtually all new flight simulation aircraft.



For More Information

Check the Train Simulator World Web Site at:

<http://trainsimulatorworld.com/>

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MESSERSCHMITT Bf109



SBD "DAUNTLESS"



P-51 "MUSTANG"



FG-1D "CORSAIR"



P-63 "KINGCOBRA"



POLIKARPOV I-153



Flying The Big Iron

I was turning final approach for runway 27L at the Chicago's O'Hare International Airport. It was a busy day, as the VATSIM controller did his best to space out the inbound traffic. I was flying a Boeing 737 jet in Orbit livery. The controller called out traffic

ahead, and indicated that I was about 3 miles in trail. For whatever reason, that traffic started to get a little slow and our spacing was reduced as time went on. He finally touched down on the runway just as I came up on the two-mile point.

As I came up on short final, I realized that he wasn't going to get off anytime soon, and the thought of a "fender bender" didn't seem like the best way to end a two-hour

flight. So as I came right over the threshold, I decided that it was time for a go-around.

Waiting that long was my biggest mistake. I added power and the airplane kept descending. I could hear the engines rev up as the runway view became uncomfortably large on my windshield.

Finally, the jet's speed increased and up I went into a nice climb over

By Arturo Weiss

the runway. I was close (very close) to leaving some scrap metal on the runway. "Bad move," I thought to myself as I climbed away for the next approach, "remember you are flying a heavy jet!"

Thinking In A Jet Mindset

I learned a couple of lessons from this experience. First and foremost, I had forgotten that I was flying a heavy jet, and not a piston driven light aircraft as I had done a few nights before. You may be asking "What difference that that make?" Well, quite a few actually. You see, jet aircraft fly differently than your general aviation piston-driven trainer. You don't have to be a super pilot to fly one of these. You just need to plan and stay well ahead of the airplane.

I've been lucky enough to fly some real jet aircraft both in the simulated and real environment. I've flown the A300-B4 full flight simulator quite a bit, and learned a few lessons from that time in the "box." So, taking the risk of sounding like an airline check airman, (which I'm not) I'd like to impart some tips for your future jet flight simming ventures.

The Makings Of A Jet Engine

Before we talk about the differences between flying jets and piston aircraft, it would only be fair to look at what makes each one "tick." Carbureted or fuel-injected engines power piston aircraft. In either case a fuel/air mixture is compressed and ignited in a cylinder where a controlled "burning" is caused. The exhaust drives a piston, which in turn drives crankshaft that eventually turns a propeller. This is a very simplified description of an internal combustion engine, but I think you get the point.

Looking at a jet engine, we see an altogether different setup. Yes, we still have a fuel/air mixture, but what happens next is where the two types of engines branch apart. Before we get to that point, let's take a brief overview of what makes up a jet engine. Jet engines contain three common components: the **compressor**, the **combustor**, and the **turbine**. To this basic engine, other components may be added, including:

- ➔ A **nozzle** to recover and direct the gas energy and possibly divert the thrust for vertical takeoff and landing as well as changing direction of aircraft flight.
- ➔ An **afterburner** or **augmentor**, a long "tailpipe" behind the turbine into which additional fuel is sprayed and burned to provide additional thrust.

- ➔ A **thrust reverser**, which blocks the gas rushing toward the rear of the engine, thus forcing the gases forward to provide additional braking of aircraft.
- ➔ A **fan** in front of the compressor to increase thrust and reduce fuel consumption.
- ➔ An additional **turbine** that can be utilized to drive a **propeller** or **helicopter rotor**.

The *turbojet* is the basic engine of the jet age. Air is drawn into the engine through the front intake. The compressor squeezes the air to many times normal atmospheric pressure and forces it into the combustor. Here, fuel is sprayed into the compressed air, is ignited and burned continuously like a blowtorch. The burning gases expand rapidly rearward and pass through the turbine. The turbine takes energy from the expanding gases to drive the compressor, which intakes more air.

After leaving the turbine, the hot gases exit at the rear of the engine, giving the aircraft its forward push. For an extra "kick" of power, an afterburner or augmentor can be added. Additional fuel is introduced into the hot exhaust and burned. This will give you up to 50 percent additional engine thrust by way of even higher velocity and more push.

A *turbofan* engine is basically a turbojet to which a fan has been added. Large fans are placed at either the front or rear of the engine to create "high bypass ratios." In the case of a front fan, a second turbine, located behind the primary turbine that drives the main compressor, drives the fan. The fan causes more air to flow around (bypass) the engine. This produces greater thrust and reduces fuel consumption.

Supersonic aircraft (like our jet fighters) use a low-bypass system with an augmentor/afterburner for the additional power they need to catch up to the "bogeys"!

Turboprop engines are a variation of the jet engine. Actually, it's just a jet engine with a propeller assembly attached at the front end of it. There is a crankshaft of sorts connecting the turbine and propeller assemblies. Other than that, it's basically the same thing. Turboprop engines can be found on corporate aircraft like the King-Air, military transports, like the C-130 and even the top end helicopters like the Bell Jet-Ranger. In the case of the helicopter engine, the rotor blades simply replace the conventional propeller blades used on fixed-wing aircraft.

When it comes to starting a jet engine, care must be taken not to exceed the engine's parameters during ignition. If temperatures exceed the limits, a "hot start" could result. This excess in temperature could damage turbines and various other engine assemblies.



As you can see on this page and the following page, my favorite FS 2000 plane is the Boeing 737-400.

Speeding Along

In general, these airplanes are a lot faster than most of your general aviation (GA) aircraft. I say most because all your corporate jets fall into the GA category, and some of those exceed airliner speeds. But for comparison, let's just talk about your typical trainer, like a Cessna 172. In the Cessna, you typically fly along at around 100 knots (if you're lucky, have a strong tailwind, or just doing your favorite imitation of a kamikaze pilot!)

At that speed, the pilot tends to have some time to think ahead and to see what may happen in a couple of minutes. This holds true for the VFR and IFR pilot. If you're navigating by pilotage (landmarks) then you can spot them ahead in a timely manner. The IFR pilot can track and intercept radials easily (of course if you're proficient in the first place).

When it comes to takeoffs and landings, a 60 knot approach speed is easy on the eyes if you now what to look for. In other words, things happen slowly and you have the time to compensate for any discrepancies in altitude or speed.

When flying a jet, things in the windscreen move along a lot quicker compared to the Cessna. With a 140-knot approach-speed, a B737 zooms down the approach path at a good clip. You can quickly get behind the airplane in this type of scenario, and that could cost you plenty. In VFR conditions, getting behind the jet will result in altitude and airspeed excursions, if you're lucky.

Doing the same in instrument conditions could cost you much more. Consider it this way: at a ground speed of 60 knots, you'll cover a mile every minute. Bump up the ground speed to 135 knots and now your sailing along at better than two miles per minute!

Powerful Motives

Ok, so we know that we're moving along faster than what we were used to in our trusty C-172, but there are other factors to also consider. Remember when we examined the differences between the jet and piston engines? Well, that should be a consideration in your flying. In a piston-powered aircraft, engine response is pretty immediate. Granted, this may vary depending on the age and condition of the airplane's engine.

Density altitude also plays a role but when you add throttle, the RPMs increase rather quickly. This is because when the fuel/air mixture is burned, the piston is pushed up, and since it is tied into the crankshaft assembly will transfer its energy directly to it. This in turn will drive the propeller in about the same the period.

If you remember, in a jet engine we accomplish the same by "spooling" up the turbines. This process takes a relatively longer time than the piston engine. So, you'll need to compensate for this and plan your power adjustments accordingly. We're not talking minutes here, but just enough ahead to make sure that your engines respond when you want them to, especially during critical phases of flight (i.e. landings).

Evolution of the jet engine

So, how did this new engine come about? Well, in the "old days" piston-driven prop aircraft dominated the air carrier market. Really, that's all there's been until the jet engine was introduced.

Early jet aircraft had limited success, like the Comet, but suffered from design problems. The Comet had a couple accidents due to the airframe failures when it was pressurized. By the time the problem was corrected, the

aircraft's fate had already been decided. So, the Boeing 707 was the airplane that really launched air carriers into the jet age. It debuted in 1957 and seated 179 passengers. Four P&W JT3 jet engines, with 12,500 of thrust powered the 144-foot airplane, which was capable of carrying loads up to 139,000 pounds.

The Boeing 737-400 I like to fly was launched in 1988. Standard seating is for 170 passengers with a weight of 76,800 pounds. CFM-56 engines, with 22,000 pounds of thrust power this jet and provide a range of about 2,485 nautical miles.

Jet vs. Prop

Ok, so we've talked about the advantages of speed between the two engine types. But, there are other advantages/disadvantages to note.

Jet engines are meant to fly at high altitudes because that is where they perform best. At altitude, the engine runs a lot more efficiently than near sea level, therefore the fuel expense is less. The engine really performs poorly in slow and low operations, like on an approach to landing. This is where they tend to guzzle the most fuel and therefore blow money right out the tailpipe.

This is why you'll seldom see an airline accountant rave about how much money the engine burned while droning around a holding pattern. Aside from the economic standpoint, the jet engine's high altitude capability offers other types of benefits too. Its high altitude performance also allows for flights above most weather conditions. This means that a jet aircraft can eliminate all the bumping around prop aircraft experience while punching through those lower-level clouds.

Mechanically speaking, jet engines offer the aircraft operator some benefit too. These engines are usually



on the connected parts literally wears components apart after a period of constant operation.

Jet engines are meant to fly at high altitudes because that is where they perform best. At altitude, the engine runs a lot more efficiently than near sea level, therefore the fuel expense is less. The engine really performs poorly in slow and low operations, like on an approach to landing. This is where they tend to guzzle the most fuel and therefore blow money right out the tailpipe.

much more dependable than piston engines. The main reason for this is that they have fewer moving parts than their piston counterpart. Remember in a piston engine, you have pistons, rods, crankshafts linked together in constant state of movement. This energy and vibration

However, a jet engine has a lot fewer connected parts in the same configuration as the piston power plant. Remember, in this engine we basically have a series of spinning turbines in connection with a combustion chamber. There are no components like piston rods to

Flying The Big Iron

worry about here. So catastrophic failures are not as frequent as seen in piston engines.

Of course, I'm talking generalities here. We have all seen cases of jet engines blowing turbine blades out like a piece of bad chicken. But, overall that's how the two compare. The downside of a jet engine, in a mechanical sense, becomes clear when it's taken into the shop for some maintenance work. Reliability comes with a big price and jet owners definitely pay when it comes time to tear the engine apart.

Overhauls are extremely expensive, when compared to the same work on piston engines. "Hot section" work involves the tear down of the combustion chamber area and that translates into big bucks. So, piston engines do have several benefits over their turbine counterparts.

Speaking of drawbacks, the jet engine does suffer from one other aspect. Remember when I talked about the "spool-up" delay when I did my go-around at JFK? Well, that's exactly what I'm referring to here. Because the engine consists of several stages of turbines, they must "wind" themselves up when the power is applied. During normal operations, this is not a problem, as it just takes a matter of planning.

However, some kinds of operations require instant response and aircraft have been tailored for those situations. Case in point is the "Hurricane Hunter" airplanes operated by the National Oceanographic and Atmospheric Administration (NOAA) and the Air Force Reserves. Both of these agencies operate turboprop aircraft for these missions. NOAA uses the P-3 Orion, while the Air Force Reserves use the rugged Hercules C-130.

So, why have these agencies chosen to use Turboprops rather than the proven, faster jets? Well, it goes back to the first principle I was talking about. In these types of operations, engine response is critical to safe operations. We talked about the "spooling" up of jet engines and the slight delays experienced in power applications.

Turboprops help to solve that problem. While we still have the spool-up of the engine core, the propeller blades actually redirect the output accordingly. In other words, the prop blade angles are changed by the pilots' actions inside the cockpit and the RPM is immediately increased/decreased as needed. This system is called a variable-pitch propeller system, and anyone who has flown one knows what I'm talking about.

Never had the chance to fly a real variable-pitch system? Well, why don't you experiment a little on your favorite PC simulator? Move the blue lever on your throttle quadrant around and observe the RPM changes. For more information on this system, I strongly suggest



Boeing 737-400 on Very Short Final.



Finally, the jet's speed increased and up I went into a nice climb over the runway. I was close (real close) to leaving some scrap metal on the runway.

that you read one of the many informative texts out on the market.

Cyber Jets

Enough of the theoretical talk; let's discuss just how you can benefit from your cyber jets. What does this all mean you the flight sim enthusiast and cyber pilot? Well, if you're one of those enthusiasts who enjoy flying in a realistic environment, this should give you something from which to work.

I'm one of those people and enjoy flying just like the major carriers do. Yes, that includes withholding from those barrel rolls in the B-737 or looping the DC-10 over

Meigs Field! In order to do that, I like to follow some semblance of what the "big guys do". This includes following checklists, flying with VATSIM or IVAO, and monitoring the engine instruments on a consistent basis.

I also enjoy selecting a more realistic aircraft behavior and handling level under the "aircraft properties" menu. Depending on your comfort level, you may choose to do the same. The good thing about this is that the aircraft will respond more like it's supposed to. That is, if the aircraft designer did a good job at it. Aerodynamic forces will now play a larger part in how the airplane flies and engine operations will be a bit more realistic. This is where the fun begins!

You may also want to navigate using a Flight Management System (FMS). There are several versions available out there on the Web.

Practical scenario

Let's walk through a quick takeoff scenario on a generic Microsoft Flight Simulator 737-400. You're lined up on the runway, after start-up (watch out for those hot starts!), pushback and taxi. The N1 gauge at the top of the engine instrument stack is the primary engine power indicator. It represents the RPM (in percent) of the primary engine fan. Apply power smoothly and keep the readings on the N1 gauge in the green range. Remember, the jet engines take some time to "spool up." If you shove the thrust levers forward, you're likely to shoot right past the typical takeoff power setting of about 96% N1 and over-speed the engines.

As you roll down the runway, remember to call out your *V speeds*. What's that, you say? Don't know what I'm talking about? *V-* speeds are the critical numbers for takeoff. *V1* is takeoff decision speed. If you detect any problems before you reach this speed, abort the takeoff. Once above this speed, you're committed to taking off no matter what. Why this? Because on a typical runway, there's not enough concrete ahead to stop the airplane in case of an aborted takeoff. You're much better off lifting off on the available engines than trying to stop the takeoff roll and running off the end of the runway.

At sea level, on a cool day with the 737 at its maximum takeoff weight, *V1* is about 150 knots. *Vr* is rotation speed, the speed at which you smoothly raise the nose to about to lift off the runway. In this case, we'll use 151 knots. Like any airplane, you must rotate smoothly. Give it about 3 seconds to reach the 10-degree nose-up pitch attitude. *V2* is takeoff safety speed; the minimum safe



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flying speed if an engine fails. A good speed for the 737 is 160 knots. Hold this speed until you establish a positive rate of climb. As you retract the landing gear, the airplane will quickly accelerate to *V2+15* or *V2 +25* knots.

Maintain this speed until the airplane is about 1,000 ft above the ground. Now it's time to retract the flaps, and *Vfs* is the flap retraction speed. A good rule of thumb for the 737 is *V2+ 15*, or 175-190 knots. Now you're clear to keep on sailing to your destination airport!

So, that's cyber jet flying in short. It really doesn't take much to fly a jet aircraft, just understanding of its composition and some planning. I invite you to fly various types of PC flight simulation jets. There are many models available on the Web. Some of these, designed by expert flight simmers, have superb and realistic equipment and flying qualities. Most importantly, take a moment and learn about this type of aircraft. After all, they are flying over our heads on a daily basis, and I wouldn't want it any other way!

Flying Online!

Improving The Online Flying Experience



This time around the patch we'll learn about the new VATSIM.net organization for online flying and see what online controllers view as the "Top Ten" areas in which pilots can help improve their online flying experiences. We'll also take a look at the *ServInfo* program for finding detailed information about who's flying online. At the end of the article I'll describe an impressive online training aid for learning about runway safety.

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Tabular display of pilots on VATSIM network.

Organization Update

As many readers already know, there has been a change in organization name and leadership of the largest online flying network. Succeeding the former SATCO organization, the Virtual Air Traffic Simulation Network (VATSIM.net) is the new global online community that provides structured air traffic control services via the Internet by using the *ProController*® and *SquawkBox*® software programs for online controllers and online pilots, respectively.

As indicated on the new website (<http://vatsim.net>), the VATSIM mission and vision is "to provide the highest-quality and most realistic flight simulation experience possible, while maintaining respect and accountability to the end-user." I invite you to browse the new VATSIM website to locate all available resources, particularly including the **Get Started** link for new users. You can register for VATSIM online using the **Join Now!** Link.

By Doug Horton



Clearly, this new organization for online flying, and online flying itself, are increasingly popular, as 10,000 users registered for VATSIM in its first 29 days of operation!

“Top Ten” Lists

As I emphasized in the last issue, flying online includes a partnership among pilots and controllers. Within the online flying community, various training divisions typically certify controllers. Pilots are currently not certified, but plans are underway at VATSIM to do so.

Many online controllers are also ATC controllers in the real world. Accordingly, there is often an understandable “training gap,” with pilots often lacking some of the detailed knowledge and flight training required to make the online flying experience run smoothly. In response to the “training gap” issue, I asked several VATSIM controllers to assemble a “Top Ten” list of knowledge and flight performance issues that pilots ought to know or could perform better.

Courtesy of Mike Hayden, a real air traffic controller, VATSIM Board of Governors, and VATSIM VP of ATC Training, I was provided with top ten lists from VATSIM controllers Matt Gunter, Ron Lemke and J. Jason Vodnansky. I’ve looked for the common issues in the three lists that pilots might learn more about. I merged these issues into a consolidated “Top Ten.” Here’s the list, and in this and future articles I’ll draw upon VATSIM and real pilot training materials to increase knowledge and flight performance related to these issues.

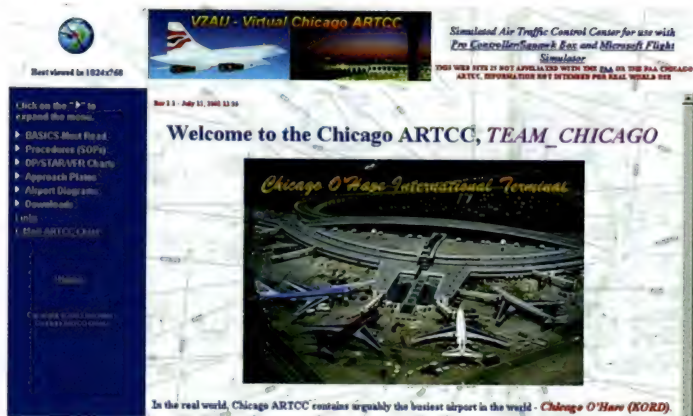
1. A rule for real flying is “Aviate, Navigate, and Communicate” in that order. Though this might be assumed, it is extremely important that online pilots learn to fly their aircraft and learn to navigate before connecting online. ATC controllers can’t stop their work to explain where a particular VOR is located, how to navigate to a VOR, or where to find a certain

VOR frequency, for example. Minimum pilot training should include working through Rod Muchado’s Private Pilot lessons in FS2000. They’re excellent!

2. Use available software programs, or get real charts from a pilot shop at a nearby airport, to file realistic flight plans. It is unrealistic to file “direct” or “GPS direct” for online, as well as real flying. Flight Simulator add-ons such as freeware programs *Nav 3.0* by Ted Wright, *FSBuild* by Ernie Alston, or the commercial package *FSNavigator* by Helge Schroeder provide easy means to produce realistic flight plans. All of these programs can export flight plans into FS2000. According to Ron Lemke, a good flight plan is one that includes at least one VOR in each ARTCC or FIR, and use of airways is a plus.
3. Understand that the flight plan you file may not be what you get as your initial clearance. Remember also that the general format for IFR clearances follows the acronym **CRAFT**:
 - ➔ Clearance limit – “you are cleared to...”
 - ➔ Route – via radar vectors, or airways, waypoints, etc.
 - ➔ Altitude – usually initial and next altitudes after takeoff such as “10 minutes after departure”
 - ➔ Frequency – for Departure Control
 - ➔ Transponder – squawk code

This is a convenient way to write out your clearance before reading back to Clearance Delivery. Also, remember that you may get revised clearance element in the air, and in general, you will only be told the elements that have changed, such as the route or altitude.

1. Since most online flying involves simulated airline flights out of and into large airports, it is also realistic to get Departure Procedure (DP), Standard Terminal Arrival Route (STAR) charts, Approach charts, and Airport diagrams for your departure and arrival airports. The best free sources of these charts are the applicable VATSIM ARTCC and FIR websites, which can be linked from the main VATSIM site, since these are the charts the associated controllers will be using. For example, I linked to charts for airports in the Chicago ARTCC at <http://avsim.com/hangar/satco/chicago/mainpage.html>. This took only about five seconds with just a few intuitive links from the VATSIM home page.



The blue box on the left side of the Virtual Chicago ARTCC website contains links for getting DP, STAR, VFR Terminal Area, Approach, and Airport charts.

2. Per the rule of "Aviate, Navigate, and Communicate," it is standard procedure to execute ATC directions before acknowledging. This doesn't mean completing the ATC instructions before communicating, but in the case of course and altitude changes, you should start the turn, climb, or descent, and then acknowledge.
3. VFR versus IFR - Pilots must realize that there are distinct differences between VFR and IFR flying under ATC. VFR pilots must realize that just because they don't always have to talk to ATC, they are limited to where they can be. A VFR pilot still needs a clearance, must get a unique squawk code, and must talk to ATC if departing a Class B airport such as O'Hare, or when departing from a Class C airport such as Chicago Midway. A VFR pilot must talk to Ground and Tower at a Class D airport. Visiting a local pilot shop to get the local VFR Sectional for the airports from and to you are flying is highly recommended and quite educational. VFR pilots also have definitive cloud clearance requirements, such that at no time may a VFR pilot enter a cloud. When in doubt, file IFR!
4. Don't pause or leave your computer without notifying ATC, and don't operate at higher than 1X simulation rate without controller approval.
5. Don't start up on an active runway and don't slew from a ramp area to the active runway. Instead, for complete realism, move your aircraft to a ramp area before connecting online, and then taxi as directed.
6. Be prepared for amended clearances, courses, or altitudes that are different from what you filed. This is very "real-world" and if you reprogram the *SquawkBox* FMC, that's equivalent to what real airline pilots must do in response to ATC instructions.
7. Lastly, if you are new to online flying, it's okay to make that fact known to controllers by saying so in the Remarks section of the *SquawkBox* flight plan, with words such as "First online flight," "New to

online flying," "Newbie," etc. Also, if you haven't yet figured out where to get DP's and STAR's, enter "No DP/STAR" on your flight plan, but learn soon how to use these real world procedures. On the other hand, if you haven't figured out where to get Approach charts and how to make instrument approaches, wait to fly online IFR until you do. One easy way to do this is through the Instrument flight lessons built into FS2000; I used these to help me achieve a real instrument rating earlier this year, and they are excellent.

Controller Hierarchy

Suppose you logon to the VATSIM or IVAO online flying network through *SquawkBox*, and the departure airport you've chosen is only staffed by a Center controller. There's no Clearance Delivery, Ground, Tower, or Departure controller active. What do you do? By way of review, it's important to understand the ATC positions that are typically staffed in the real world.

As with online flying, these positions may be combined. There are three basic types of ATC facilities: Control Towers, Approach Controls (or TRACONs), and Air Route Traffic Control Centers (ARTCCs or "Centers"). Within each facility there are individual operating positions. Here is a basic summary of where each position is located and what functions it performs:

Clearance Delivery (DEL) - Located in the Control Tower, Clearance Delivery is often combined with Ground Control. It issues IFR clearances and general advisories.

Ground Controller (GND) - Located in the Control Tower, Ground exercises control over taxiing aircraft and vehicles. It issues departure information, weather conditions, and airport advisories. Ground also maintains a general surveillance of the airport including taxiways and inactive runways.

Local Controller (TWR) - Also located in the Control Tower, Local is in control of all arriving, departing, and enroute aircraft on the runways, in the VFR traffic patterns, and in the Class D airspace. It maintains a constant visual surveillance of the airport and surrounding airspace. Local Control normally selects the runway in use.

Approach Controller (APP) - The primary position located in the Approach Control, it controls all IFR aircraft within its portion of the Approach Control's delegated airspace. This airspace will include the primary airport and may include other satellite airports. Approach provides vectors to the airport and issues approach clearances. Very busy Approach Controls may be divided into multiple positions (sectors) such as Departure, Arrival, East Approach, West Approach, etc. Each sector is responsible for a piece of the Approach

Control's overall airspace. When a sector's airspace includes Class B or C airspace the position also controls any VFR aircraft in the area.

Departure Controller (DEP) – Another position located in the Approach Control, Departure also controls all IFR aircraft within its portion of the Approach Control's delegated airspace. While this portion is primarily the airspace used by aircraft departing the primary airport, Departure may also have satellite airports within its airspace and it would perform the Approach Controller function for those airports.

Center Controller (CTR) – Located in the ARTCC, the Center Controller provides ATC services to aircraft operating on IFR flight plans within controlled airspace principally during the enroute phase of flight. Like Approach Controls, ARTCCs may also be broken up into smaller sectors with each sector being responsible for its piece of the overall ARTCC airspace.

In the real world, there are limits placed on what positions may perform what functions. In the online flying world, there is a standard procedure, which states that if the position that normally performs a function isn't staffed, the function moves to the next higher position. So if Ground isn't staffed, but Tower is, Tower performs Ground's job. And so on up the chain.

However, this is not a hard and fast rule. If an online controller can't handle all other functions, then shortcuts and alternatives are often used. For example, if you intend to take off from an airport that is located such that only Center is manned, and Center is not busy, you might get clearance, taxi, take-off clearance, and departure instructions from the Center controller. On the other hand, if Center is busy, the Center controller may direct that you take-off and call when airborne, call after reaching a certain altitude, or give other instructions.

ServInfo

How can you tell before an online flying session which controllers are active? One popular means is using Enrico Schiratti's *Whazzup* program, as described in previous issues. I've also discovered a new program written by Michael Frantzeskakis, which is called *ServInfo*. It's similar to *Whazzup*, except that it displays results about VATSIM or IVAO participants in tabular form. And it provides a bit more information, if you're really curious, because information can be sorted in a variety of categories.

When a pilot's name is highlighted in ServInfo, an information box pops up with details of their flight plan.

ServInfo is a freeware utility that provides integrated information for the on-line flying activities in the VATSIM, IVAO or any other online flying network that uses the *SquawkBox* and *ProController* software. Online activity information is presented in a convenient tabular display format, allowing users to easily find out flight and controller position details either worldwide, or focused to specific countries or airports in a instant one-click customizable way. The information provided includes:

- Callsigns & names of controllers and pilots
- Airport names and locations
- Controller position identification and locations
- Flight status (icons indicating departing, airborne and landed flights)
- Detailed information for each flight on a separate window, including filed route, progress bar, closest airport, and estimated arrival time.
- Controllers' frequencies and ratings

This information can also be saved in a file and retrieved off-line.

ServInfo can also:

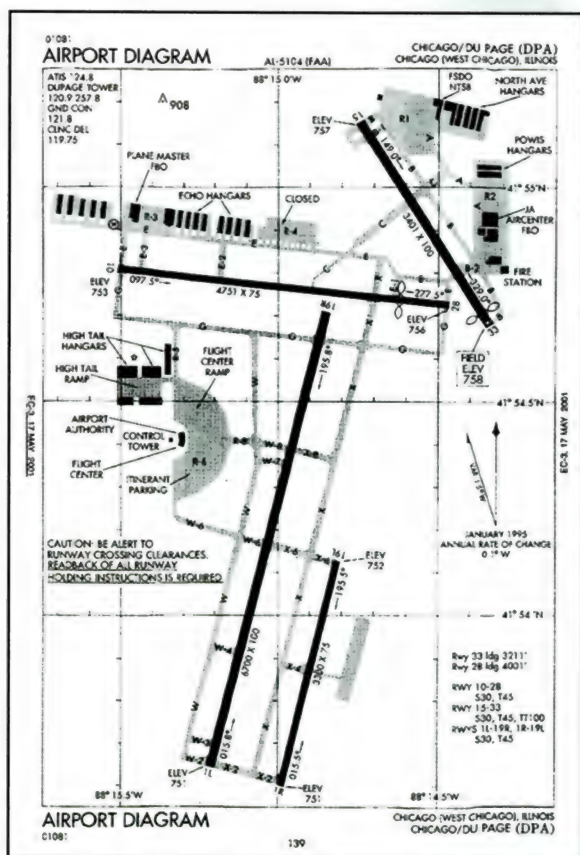
- Ping and display response times for all the network servers that are on-line
- Display channel & user information for voice servers used for communication between pilots and ATC
- Display METAR reports for any airport, or all stations in a country

- ➔ Be minimized as a system tray icon and handle data loading and refreshing from there with a right-click menu

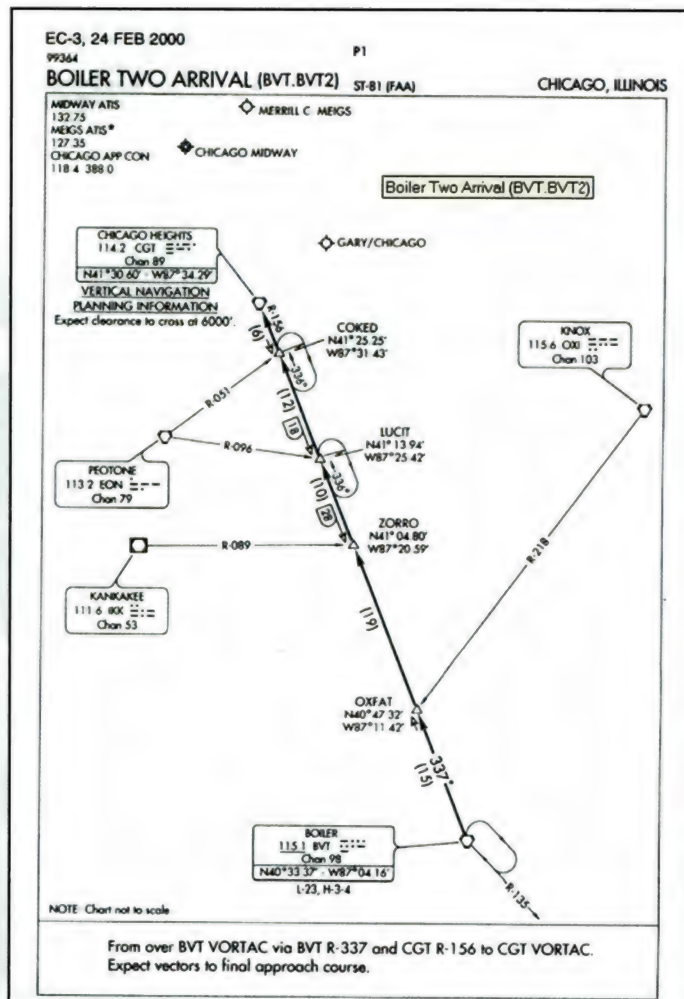
There is no need to have any specific flight simulator or the *Squawkbox* or *ProController* software installed on your computer to run *ServInfo*.

Online Runway Safety Training

An important issue in real aviation is the hazard of runway incursions. Television news programs report a major incident almost every week or so, and there are many more unreported near misses. Even at the airport from which I fly, West Chicago DuPage (KDPa), we have occasional problems – sometimes in reverse. Call it “taxiway incursion,” as a pilot who received controller direction to land on runway “one niner right,” heard “niner right.” There isn’t a runway 9R at DuPage, but that didn’t stop the pilot. He landed a twin-engine Beech Baron on taxiway Golf on the right side of runway 10.



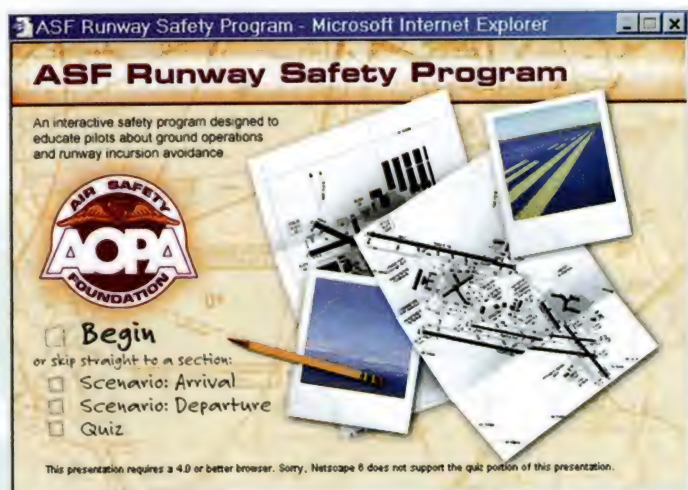
Airport diagram of KDPa, showing how a pilot who heard “niner right” instead of “one-niner right,” mistakenly landed on taxiway G, on right side of runway 10.



This chart from the Chicago ARTCC website shows the Boiler Two STAR for arrival from the southeast into Chicago Midway (MDW) Airport.

Can you picture it? Look at the accompanying airport diagram to see where taxiway Golf is located just to the right of runway 10. The lesson here is the need to study the destination airport diagram as part of your pre-flight preparation. Online and real pilots can find free downloads of U.S. airport diagrams, as well as approach and departure charts at <http://edj.net/cgi-bin/echoplate.pl>.

As an innovative response to this issue, the Aircraft Owners and Pilots Association’s Air Safety Foundation has an online, interactive training program on runway safety, including arrival and departure procedures, runway incursion avoidance, and landing and hold short operations (LAHSO). This is a very well constructed computer-based training aid, which is fun and informative to work through. It includes printable airport diagrams for a Bonanza arrival at Long Beach, California (KLGB), a Skyhawk departure from the General Aviation terminal at Pittsburgh, Pennsylvania (KPIT), and a 15-question quiz. The program can be found at http://www.aopa.org/asf/runway_safety/#.



The online ASF Runway Safety Program provides an interactive training program on ground operations and runway incursion avoidance.

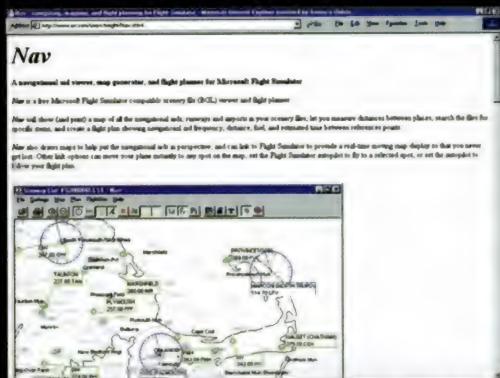
In online flying, runway incursions are of course "virtual," but in the interest of "getting real," it's important to understand standard real world procedures and online flying protocol. As indicated above, controller responsibilities transfer up the line if not staffed. So, online pilots should look for staffing of Ground, Tower, Departure, and Center controllers, to see who will handle requests to taxi.

File Box

Internet addresses of programs mentioned in this article

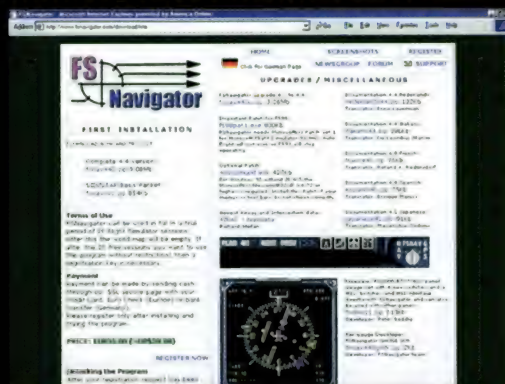
Nav 3.0 by Ted Wright

<http://www.en.com/users/wright/Nav.shtml>



FSNavigator by Helge Schroeder:

www.fsnavigator.com/download.htm



FSBuild by Ernie Alston

<http://ourworld.compuserve.com/homepages/alstoer1/fsbuild.htm>



ServInfo by Michael Frantzeskakis

<http://avsim.com/hangar/utls/servinfo/downloads.htm>





In the first two parts of this series, I described the U.S. requirements for an instrument rating, how I got started with instrument training, how I learned about attitude instrument flying, how I used the lessons in FS2000 to learn more about instrument flying, and how I learned the required maneuvers for the instrument rating. In this issue, I'll describe how I used my flight simulator setup at home to practice many of these maneuvers, as well as how I flew my first practice flights with actual instrument clearances and real ATC communications. First, a few words about flight simulators and training devices.

Getting Real

Training For An Instrument Rating Part 3

Flight Simulators and Flight Training Devices

Having been involved with computer flight simulation for over 10 years when I began my instrument training, I was curious about how I might use simulation in my training. The short answer is that I didn't use any of the FAA-approved devices, with which I could have counted the hours toward my training. Instead, I practiced on my home simulator setup, for which the hours didn't count, but which were quite valuable anyway.

An instrument candidate in the U.S. can perform 20 to 30 hours of the 40 required instrument training hours with an approved flight simulator or flight training device (FTD). Approved flight schools can offer 30 hours, so in my case, I could perform up to 20 hours with an approved simulator or training device. However, the regulations also indicate "provided by an authorized instructor," so the regulations don't allow the instrument rating candidates to just use the devices by themselves and have it count.

At the time I began my training, I was tempted to use an approved simulator or FTD, because of my ten years experience with personal computer flight simulation, so I investigated this option further.

I found that some of the instrument training devices are simply desktop control panels and flight controls, without any visual picture. With these, you track VORs, practice holds, and perform approaches by only seeing the simulated radios and aircraft instruments. In my view, the problem with these devices is that the final and critical stage of approaches does not provide realism. This is the time during which you hope to break out of the clouds, verify that you meet the requirements for landing by seeing approach lights, the

runway or other specified cues, and then land. On the other hand, some devices that resemble a full cockpit and have a separate instructor station. These devices are much more elaborate and provide a visual picture.

Another category of FAA-approved IFR training device is PC-ATD – Personal Computer – Aircraft Training Device. These devices include a yoke or controls console, radio stack, and rudder pedals, and all flight instruments and a visual picture are shown on a computer monitor. Examples from one manufacturer, Elite Simulations, are shown in the accompanying figure.

In these examples, the computer and monitor are purchased separately. The software accompanying these the hardware also provides the visual picture for final approach, and some new PC-ATD software includes elements of scenery and terrain. The prices for the hardware and software for these devices can range from a few thousand to over \$10,000. These devices have earned a place in flight schools where they can be used efficiently by many students, but the prices seem high for individual ownership, except for those who are interested in building full home cockpits.

A student may already be a user of realistic flight simulator program and already have realistic yoke and rudder pedals, which might be purchased for \$200-300 combined. The question is what additional training benefit is provided spending thousands of dollars more to get more realistic yoke and rudder pedals, and in particular more realistic radio controls, compared to using mouse clicks to change radios and instrument settings.

Also, the cost of renting time on one of the more elaborate of these systems at a flight school with an instructor is not significantly different than the cost of flying my club aircraft with an instructor. The hourly cost of the most basic PC-ATD, which has no outside visual display for finishing approaches with a landing, is only slightly lower than another allowed option: flying with a "safety pilot".

The older Flight Training Device category, without a visual picture, is best used for practicing holds, VOR tracking, and the initial phases of approaches. But without a visual picture of any type, they obviously can't be used for final approach

By Doug Horton

and landing. I chose to not use any of the FAA-approved PC-ATD simulators or flight training devices based on the economic trade-off with flying a real aircraft with an instructor. Most of them don't appear to offer the visual realism provided by the latest PC flight simulators at the critical point of breaking out of the clouds, seeing required runway visual cues, completing the approach, and landing. Perhaps in time, we'll get to a point at which our simpler home setups can be FAA approved.

Safety Pilots

Since 40 hours of instrument time, but only 15 hours of actual airborne instruction is required, an alternative to using flight simulators or training devices is flying a real aircraft "under the hood" for up to 25 hours with another certified pilot acting as "safety pilot."

The safety pilot doesn't even need to be instrument rated, as their role is to help avoid other aircraft and possible obstacles, and if needed, prompt the pilot in case he or she becomes spatially disoriented. I found that I could recruit many pilot friends and members of my flying club to provide this service, and since some of the safety pilots who flew with me are instrument rated, I got *advice*, though it wasn't officially *instruction*.

Flying with a safety pilot was quite valuable practice. It saved a few dollars of instructor cost, and it was somewhat more relaxed than flying with an instructor. It's also an important concept to utilize for the remainder of my flying hobby, because to maintain an instrument rating, pilots must practice holds, perform VOR tracking, and perform at least six practice instrument approaches at least every six months. The easiest way to do this is with two pilots taking turns acting as safety pilot for each other.

Flight Simulator Practice

Since I chose not to use any of the FAA-approved PC-based flight simulators or flight training devices, I decided to use my own setup for practice and not try to get any of my required hours from flight simulation. This might be considered a paradox, in that someone who is simulation advocate (actually, addict!) would elect not to use the approved simulation devices. Instead, I spent a great deal of time with FS2000, X-Plane, and Fly!2k doing lessons, practicing holds and approaches, and flying with simulated air traffic control.

In terms of my setup, I have both CH Products Flight Sim Yoke USB and Pro Pedals USB. All are plugged in to my home office computer with a high-quality 19" monitor, which I operate in a resolution of 1280 x 1024. I'm running Windows 2000 Professional on an Athlon 1.2 GHz CPU, with 512 Megs of PC133 RAM and a GeForce 2 GTS video card with 64 MB memory. Certainly, this is far short of the multi-thousand dollar FAA-approved systems, but it's entirely sufficient for me to practice instrument procedures, including the required

elements of holds, VOR tracking, all types of approaches (with weather set in), and ATC practice.

I mentioned holds in the last article, and holding is a maneuver about which most flight simulator users know very little. Because this area is new to most of us, I'll provide a short review.

Holds begin with a clearance to a published hold, or a hold that ATC simply directs. An example of a clearance to an unpublished hold is: "N4419F, you are cleared to hold east of the Joliet VOR on the 090 degree radial, 3500 feet, expect further clearance at (time UTC)." With this form of clearance, right turns and one-minute legs are assumed. If "left turns" or other leg specification, such as "two minutes" or "three mile" might be directed. This hold would look like the accompanying figure.

The first skill to practice is holding pattern entries. To review, these would be "parallel," as shown with entry from sector (a), "teardrop," as shown with entry from sector (b), or "direct," as shown with entry from sector (c). There's more to entry techniques, but this is the basic description. The best way to practice this on the computer is to use the map feature in either FS2000 or X-Plane to place your aircraft about five miles from a VOR or intersection, issue yourself a mock holding clearance, then make the entry and begin holding. Next, get some wind (about 20 knots to start) into the sim at the holding altitude, and make up a hold with the holding axis crosswind. This requires heading offsets on both the inbound and outbound legs to "make good" the desired courses.

The last time I practiced holding in a real aircraft with an instructor, he issued a mock holding clearance with assumed standard right turns, then amended the clearance before I entered, to provide left turns. This changed my entry from teardrop to parallel, and I got thoroughly confused and started to make an incorrect, opposite turn midway through the entry. One of the issues with hold in the flying of small private aircraft is that they may be seldom encountered, but if ATC directs a hold, there may be other aircraft "stacked up" over the same point at different altitudes, so it is a vitally important maneuver to practice.

Similarly, I used FS2000, Fly!2k and X-Plane to practice approaches and ATC. For the approaches, I set up weather to provide a lowest cloud layer with bottom just above the Decision Altitude for ILS approaches and above the Minimum Descent Altitude for VOR and NDB approaches.

Practice was most easily done in FS2000 and X-Plane, because of the ease with which I could enter weather settings and use the respective map views to place my aircraft in position for starting the approaches. I used a combination of all three programs for ATC practice, using ProFlight 2000 for the ATC for FS2000, the native ATC in Fly!2k and X-Plane (with voice synthesis installed).

I enjoyed using Marc Shrier's Cleared 4 Takeoff with Fly!2K, enabled by Anthony Merton's Flyscripts. The only lack of realism I found with flight simulator ATC practice was the variety terminology and directions experienced with real ATC controllers.

ATC Practice Flight

In several lessons, my instructor "played" ATC, and I responded to his communications. But about two-thirds of the way through my training, it was time to go "live" within the real Air Traffic Control system. To accomplish this, my instructor prompted me to file three "back to back" IFR flight plans: DuPage (DPA) to Janesville, Wisconsin (JVL); JVL to Rockford, Illinois (RFD); and RFD back to DPA. I filed my plans over the phone with the nearest Flight Service Station, which is located in Kankakee, Illinois. This lesson was very intensive as it included four approaches and ATC control under three IFR flight plans.

DuPage to Janesville. Here is the sequence of controllers I interacted with for the first leg, which for users of flight simulator ATC programs or online flying, should look quite familiar:

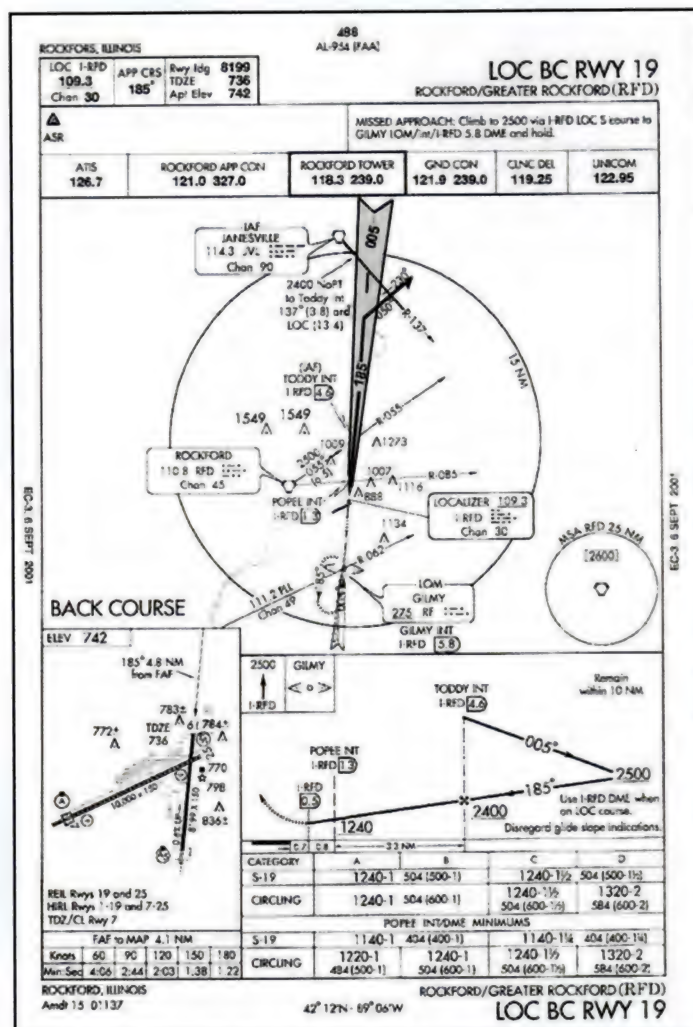
- Q Clearance Delivery, on the DPA Ground frequency DPA Ground, to provide taxi instructions
- Q DPA Tower, giving clearance for takeoff
- Q Departure, providing altitude and course toward Rockford and Janesville
- Q Chicago Approach, which serves the area between Departure and Rockford Approach
- Q Rockford Approach, which provides Terminal Radar Service for Janesville, and cleared me for my approaches, then
- Q Janesville Tower, to get clearance to land

During this flight plan, I requested practice approaches from Rockford Approach, which responded by asking what my first two approaches would be and how they would terminate. I responded that the first would be JVL ILS runway 4 to a missed approach, followed by JVL VOR runway 22 to a full stop and taxi-back.

As a result, I was vectored for the JVL ILS 4 approach, transitioned to Janesville Tower as directed, was given clearance to land, though I reported a missed approach after descent to the Decision Altitude. I was directed to contact Rockford Departure, which vectored me out to the northeast and back for the JVL VOR 22 approach. After "contact Tower," I got clearance to land and did so, then taxied back to the beginning of runway 22.

Janesville to Rockford. I was directed to stay with Janesville Tower during my taxi-back, and I was given clearance instructions by Tower for the short flight plan to Rockford. After takeoff clearance and takeoff, I moved to Departure, which was followed shortly by going back to Rockford Approach.

Approach vectored me for my next approach, Localizer Back Course to Rockford runway 19. This was a significant challenge, and I'll skip some of the details, but see a chart of this approach in the accompanying figure. After takeoff from JVL runway 22, I was vectored to intercept the back course localizer of RFD runway 19.



Approach plate for Rockford, IL (RFD)
 Localizer Back Course runway 19

What's the big deal? Simply that since this is a back course approach, the localizer needle indication is reverse-sensing. Instead of flying toward the localizer needle to center it, I had to fly to "pull the needle back" to the center of the indicator, which though it sounds simple, is difficult to master after flying normal localizer and ILS approaches.

On the other hand, if the aircraft is equipped with a Horizontal Situation Indicator (HSI), and if its course deviation indicator is set for the front course heading, there is normal sensing. I urge you to challenge yourself and try this back course approach. Take off from JVL runway 22, set the Nav 1 radio for 109.3, identify the Morse code identifier for this approach, IRFD, and then give it a try! Notice that the Final Approach fix at the Toddy intersection is defined by the 055° radial from the Rockford VOR. Remember that you can find and print this and all other U.S. NOAA approach plates by going to: <http://www.edj.net/cgi-bin/echoplate.pl>

Rockford to DuPage. Following the frequency change to Rockford Tower, clearance to land on runway 19, and a touch-and-go landing, I was given clearance back to my home field

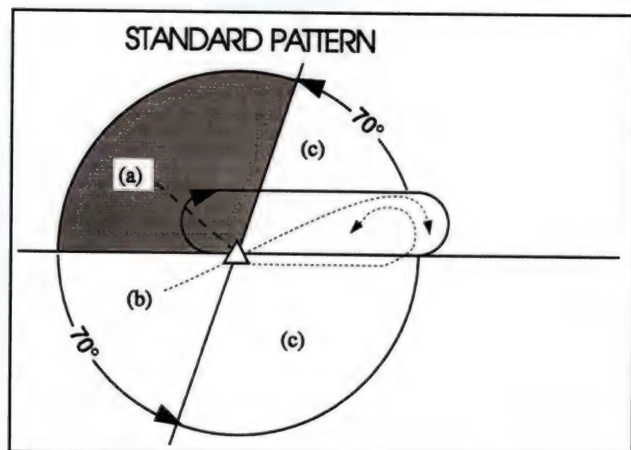


Diagram of standard holding pattern "east of (fix) on the 090 radial" with standard right turns.

of DuPage (DPA). After changing from Rockford Departure to Chicago Approach, I requested vectors for the ILS runway 1L approach.



FS2000 screenshot of practicing the Rockford localizer backcourse runway 19 approach. I'm at 1240' MSL, which is Minimum Descent Altitude, just breaking out of the clouds. It looked almost exactly like this when I flew the real approach the next day.

After being established on the localizer and glideslope and contacting DuPage Tower as directed, Tower asked how my approach would terminate. I requested circle-to-land on runway 33, which would introduce a variation of the approach and put the aircraft closer to its assigned tie-down spot.

The touchdown zone elevation for runway 1L is 754'. However, instead of descending on the glideslope to the ILS approach Decision Altitude of 954' MSL for this approach, I stopped the descent at the circle-to-land Minimum Descent Altitude of 1340' MSL, turned right, then circled left to land on runway 33.

By the way, here are the critique items from my instructor on my first real ATC flight:

- Q Reduce "chasing needles."
- Q Learn concise acknowledgements of ATC directions.
- Q Keep basic scan going while monitoring ILS, including speed.
- Q Once trimmed for 90 knots approach speed, don't change trim.
- Q Learning to "bracket" headings to compensate for wind during approaches.

Real instrument pilots will fully understand these items, and after many more approaches, I still appreciate the need to look back at these items.

Later in my training, I flew similar a sequence of approaches under ATC Janesville and Rockford, with the following approaches: JVL ILS runway 4, JVL VOR runway 4, RFD LOC BC runway 19, ASR (Airport Surveillance Radar) runway 1, and DPA ILS runway 1L. The difference was that on this day, the weather was a low broken layer, and when I called for the ATIS at Janesville, the reported visibility was $\frac{3}{4}$ mile, with a 300 foot ceiling in "freezing fog."

I assumed that my instructor would point us toward a better airport for landing. His reaction was "great day for instrument training!" So we continued with me removing the vision-blocking "foggles" just in time to break out of the clouds and see the runway just before I was at Decision Altitude of 200 feet AGL for the ILS approaches and Minimum Descent Altitude for the other approaches.

What was most amazing was that I had practiced the same approaches the day before with FS2000, with weather set to a low ceiling, and the visual "breakout" was amazingly similar. An accompanying screenshot that shows "breakout" conditions in FS2000 that were very similar to what I saw during the real approaches.

Next issue...

In the next issue, I describe the required 250-mile instrument cross-country training flight with my instructor, and I'll complete this series by describing the practical test standards and my actual instrument checkride with an FAA-designated examiner, which I passed!

Round Robin Adventures

Commuter Flight in the Province of Quebec, Canada

The scenario for this exercise is this: we are flying for Air Nova and Air Alliance Regional Airline, and are on a routine daily commute between four cities in Quebec. Our plane is a twin turbo. I flew a Beech 1900D, which is used by these airlines in the real world. There are many available at the regular Flight Sim web sites, and you can find two at my website at www.simwings.net, in the full throttle directory. One is painted in Air Alliance livery and one in Air Nova colors.

I have also included a freeware IFR Beech Baron panel (IFRBARON.ZIP). This is the closest I could come to the Beech 1900D panel. This one doesn't have working engine gauges except for the fuel gauge, but is a great IFR Panel. I have included an emergency situation for the last leg, which leaves you with only transmit capabilities on your COMM radios and the ADF for an NDB approach. All this is happening, of course, in very bad weather at night! It will have you sweating in your seat, guarantee!

One more note here. This is the geographic area where I am from originally. I have flown this exact route with Air Alliance (which has been bought by Air Nova, I believe) in the Beech 1900D. The only difference is that in real life, the flights usually originate from Montreal.

Al Pelletier

This is the route for the Round Robin you'll fly in this issue of *Flight Simulator World*:

Quebec Lesage International (CYQB)

to

Mont Joli (CYYY)

to

Baie Comeau (CYBC)

to

Bagotville (CYBG)

and back to

Quebec Lesage International (CYQB)



Panel for the Beech 1900D

About Round Robins

If you've flown previous Round Robins, skip this sidebar, jump right in and have fun. For the experienced flyers, please be patient through all of the explanations, directions and extras. I direct this at newcomers to the flying world. I must stick to plain language.

For those who are new to this, Round Robins are published with the intent of having Flight-Simmers fly, look at the scenery, refresh our geography, practice our cross country navigation, do some approaches at different airports all over the world, and have some FUN.

In the message you'll receive info like: airport departure and runway numbers, VOR and ADF frequencies enroute, two or three middle airport destinations, and instructions for either VFR or instrument approaches. Then back to your point of departure (Round Robin). You will also be given ILS and LOM frequencies, visibility minimums, procedures etc. You will get info on the scenery needed to complete the flight and where to get it. Also, who created the scenery (for non-commercial) and a little background on the geography of the area. After you do a few of these, you will have a much better command and understanding of the different types of published procedures. You will learn to handle a lot of information in a very short time, while still maintaining control of your aircraft.

May I suggest, that you READ the route a couple of times before starting out, so that you'll have the flight plan fairly clear in your mind. Especially in a fast medium jet, there isn't much time to spare and definitely no room for errors. Remember this rule: "Never let an aircraft take you somewhere your brain didn't get to five minutes earlier".

Note that for the purpose of this adventure, we will pretend that we are getting Radar vectors to different VORs or ILS interception points. In the "Real" world of today, aircraft usually get vectors to the interception points, to insure proper separation. I'm also assuming that you will have a good look at the Approach Plates for each segment. If they are not all published in the magazine, you can get them at my web site also. Check for address below.

Recommended Add-on Scenery Files

This Round Robin was created using the Microsoft default FS 2000 scenery. It can also be flown with any Simulators that have the required NavAids and Airports.

First Leg

Quebec Jean Lesage Airport (CYQB)
To
Mont Joli (CYYY)
Approximately 170 nm

- ➔ Set your clock to 06:15. Make the season to fall, weather 2800' overcast tops to 10,000', Stratus clouds 8/8, with visibility of 5 nm in light rain, wind from 070 deg. at 10 knots. You can also try this exercise with real world weather. It makes it very interesting.
- ➔ Select Quebec (CYQB) runway 6 from your World/Go To Places menu.
- ➔ Dial in the Champlain (BV) NDB at frequency 336, and the Riviere du Loup (YRI) VOR at frequency 113.90 on your NAV 2 radio.
- ➔ Takeoff and maintain runway heading, and climb to 11,000', then home the BV NDB to on top.
- ➔ On top of BV, track the YRI VOR to on top. There is no DME capability for YRI. For your information, it's a 140nm run.
- ➔ Over YRI dial in and track the Mont Joli (YYY) VOR at frequency 115.9. Also dial in the LOC at frequency 109.7 and set 059 on your NAV 1 OBS in preparation for an ILS approach to runway 06 at Mont Joli (Actual course 056 degrees, runway length 6000', elevation 172'). There is also an NDB/LOM in line with the runway, Mont Joli (YY) at frequency 340.
- ➔ 60nm out of YYY, begin your descent to 4200'
- ➔ 30nm out of YYY continue descending to 2500'.
- ➔ Intercept the LOC. There is no DME, except for the VOR, which is located right at the airfield (see approach plate).



Beach 1900D in Air Alliance colors, parked on the tarmac.



Low-level chart for Bagotville

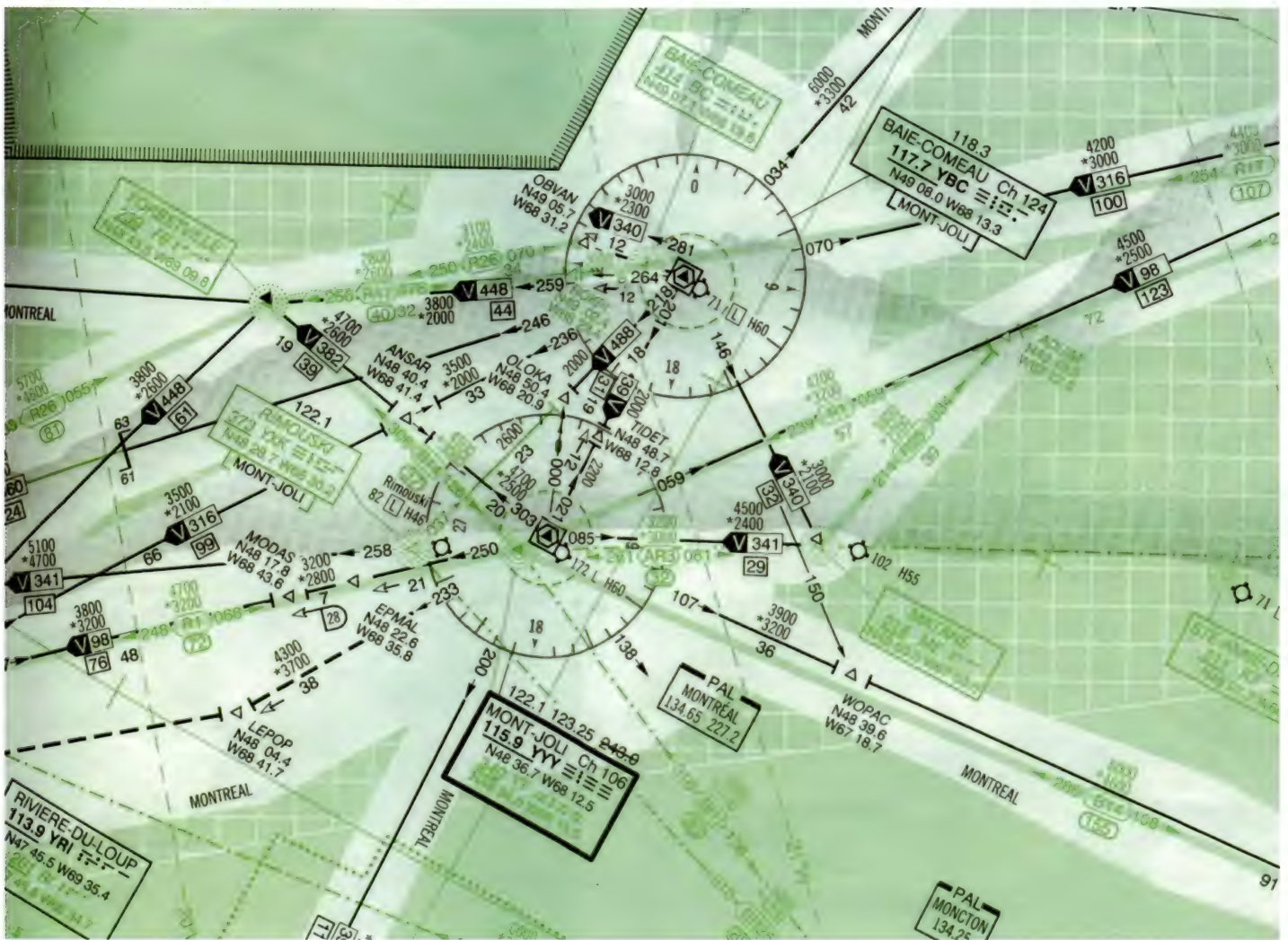
- ➔ 5 nm back you are cleared to land with a full stop on runway 6 at Mont Joli. Check to make sure your gear is down.
- ➔ Land and proceed to the terminal. Unload and pick up passengers and then carry on with the flight.

Second Leg

**Mont Joli (CYYY)
To
Baie Comeau (CYBC)
Approximately 35 nm**

- ➔ The weather is still the same.

- ➔ Set your clock to 11:30 local time.
- ➔ After loading your passengers, taxi to runway 6.
- ➔ Dial in the Baie Comeau (YBC) VOR at frequency 117.7 on your NAV2 radio, and the Baie Comeau NDB (BC) at frequency 414 on the ADF. This is a very short transit across the Saint Lawrence river, so get prepared by dialing the LOC (IBC) at frequency 110.3 (no DME) on NAV 1, and set course 101 on your OBS, in preparation for an ILS approach to runway 10 at Baie Comeau (Actual course 101 degrees, runway length 6000', elevation 71').
- ➔ Takeoff from runway 6, making a left climbing turn to 5000' to heading 020 degrees, and track the YBC VOR.
- ➔ 14 nm out of YBC turn left to 310 degrees and descend to 2500'. Start flying a 12 DME arc to intercept the LOC (see approach plate for information on flying an arc around the VOR. It usually takes a bit of practice).



Low-level map for Mont Joli.

- ➔ Intercept the localizer and continue with the approach.
- ➔ 5 nm back you are cleared to land with a full stop on runway 10. Check to make sure your gear is down.
- ➔ Land and proceed to the terminal to unload and load passengers.

Third Leg

**Baie Comeau (CYBC)
To
Bagotville (CYBG)
Approximately 133 nm**

- Set your clock to 13:00 local time. The weather is still the same as the last leg, except that the wind is now from 270 degrees at 12 kts.
- Dial in the Forestville (FE) NDB at frequency 239.
- After loading your passengers taxi to runway 28.



Climbing through overcast cloud cover

- ➔ Takeoff making a left climbing turn to 8000', homing the FE NDB to on top.
- ➔ Over Forestville turn right to 275 degrees. Dial in and home the Bagotville NDB (YBG) at frequency 356. You can also tune in the Bagotville TACAN Channel 55 (YBG) at frequency 111.8 on your NAV 2 radio for DME information (TACAN are used by the military, and unless your aircraft is equipped with the proper receiver, you'll only get DME).
- ➔ While enroute, dial in the LOC IBG at frequency 111.5 and set 290 on your NAV1 OBS in preparation for an ILS approach to runway 29 at Bagotville (actual course 290 degrees, runway length 10000', elevation 522').
- ➔ 26 nm out from the TACAN begin your descent to 4600' and turn left to 260 degrees and keep the YBG NDB about 5 to 10 degrees right of your heading in order to intercept the localizer.
- ➔ Intercept the LOC and continue with the approach
- ➔ 5 nm back you are cleared to land with a full stop on runway 29. Check to make sure your gear is down.
- ➔ Land and proceed to the terminal to unload and load passengers.

Fourth Leg

**Bagotville (CYBG)
To
Quebec Jean Lesage International (CYQB)
Approximately 120 nm**

- ➔ Set your clock to 19:30 local time. Make the weather: Stratus clouds 8/8 coverage with tops to 8500', with a base of 1400', moderate rain, wind direction 300 at 15 kts., gusting to 18 kts., visibility 3 miles.
- ➔ Dial in the Saguenay (VBS) VOR at frequency 114.20 on your NAV 2 radio.
- ➔ Taxi to and takeoff from runway 29, making a left climbing turn to 12,000', to a heading of 230 degrees. Track the VBS VOR to on top.
- ➔ Over Saguenay turn to 210 degrees. Dial in and track the Quebec (YQB) VOR at frequency 112.80. *Note: At this point we will simulate a NAV1 failure (no ILS), and a communication failure, where we can only transmit but cannot receive.*
- ➔ Set 7600 on your transponder. This indicates a communication failure. In this case, the rule for IFR weather conditions is to continue with the last ATC clearance received and acknowledged. We can transmit in the blind that we will attempt an NDB to Runway30 at Quebec Airport.



Beech 1900D in landing configuration

- ➔ Enroute to the Quebec VOR, tune in the Champlain (BV) NDB at frequency 336, and on the STBY ADF (if you have one) the St Foy (OU) NDB at frequency 329 in preparation for an NDB approach to runway 30 (actual course 297 degrees, elevation 244', runway length 5700').
- ➔ 50 nm out of the Quebec VOR begin your descent to 5500'. Reduce your speed to 140 kts or below, and home the Champlain NDB.
- ➔ Over Champlain descend to 2500' and home the St Foy NDB at frequency 329.
- ➔ On top of St Foy turn left to 117 degrees and maintain the heading for 1.5 minutes, then turn right to 162 degrees and maintain this heading for 1 minute, followed by a left turn to 342 degrees. Remain on heading 342 until your ADF needle is pointing to 297 degrees.
- ➔ Carry on with the approach. Do not descend below 2000' until 16 DME from the VOR, and be at 1600' over the NDB.
- ➔ We will land without a clearance (since we can't receive). Emergency vehicles should be there and waiting for us.

Welcome home!

You can find the Beech 1900D, Beech panel and high resolution scans of maps & charts for this article on my website at www.simwings.net or www.roundrobin.ca

Go to the Full Throttle area and look for Quebec.

Thanks to Chris Squire for test flying the route. (Chris is a retired military pilot with over 12,000 hours).

Cheers and keep on reading Flight Simulator World

An Interview with Matt Wagner

Flight Simulator World interviews the producer of *Lock On: Modern Air Combat*

In the realm of modern military aircraft simulations SSI have always been at the forefront with their Flanker series, and the various updates to it that followed as well. They are also a name to be reckoned with in the realm of naval warfare and military strategic simulations too boot!

Now they're readying *Lock On: Modern Air Combat* (LOMAC), which promises to be one of the most impressive modern military air combat simulations since *Falcon 4.0*! To give you as much information as possible on this exciting new combat simulation we recently conducted a very in-depth interview with SSI's Matt Wagner, the Producer of LOMAC.

FSW: Please tell us a little about yourself, and what other simulation projects that you've worked on before taking on the task of producing Lock On: Modern Air Combat (LOMAC)?

Interviewed by Rod White

MW: Hello Rod. Ever since I was a small child, I wanted to fly combat jets for a paycheck; however, due to a high school sporting injury, that goal became impossible. Instead, I set my sights on working in combat aviation in a different capacity. For ten years, I worked as an intelligence analyst for one of my country's intelligence agencies and during that time I worked closely with U.S. combat aviation units including lecturing at Nellis and the Navy's Fighter Weapons School (a.k.a. Top Gun). Those were some great times.

Also during that time period, I became addicted to PC flight sims. Combining my love of work and PC sims, I soon began helping various developers test their products to ensure authenticity to the limits of



what unclassified information would allow. In 1998, after a visit to the EA/Jane's studio in Hunt Valley, Maryland, I was offered a job as designer for Jane's F/A-18. This was a wonderful experience and we created a product that I'm very proud of. After F/A-18, we worked on the next EA Sports' NASCAR title for PC but by October 2000, EA had decided to pull the plug on the studio. From there, I made the jump over to SSI and here I am now as the producer for *Lock On*.



Everything from the whine of the turbine engines, to the wind over the canopy, to the ripping sound of the cannon will be recreated in visceral detail. The engine will be fast and accurately recreate the audio combat environment.

In modern air combat, the fighter pilot never flies as a single aircraft but is instead supported by multiple wingmen, AWACS, aerial refuelers and tower controllers. *Lock On* will mimic the radio commands and chatter that a combat pilot would hear in a war-

zone. The player will have the ability to individually communicate with his wingman, his second flight element, his entire flight, AWACS, and tower/approach control. Over 2,000 lines of recorded speech will make the radio come alive with feedback from supporting friendly units. The player never feels it's them against the world; they will feel as if they are part of a team.

Second, there are some interesting new features being added that I believe will add some interesting twists on gameplay. Some on these include a Log Book, so that players will be able to don their own custom persona. A player can also be an AWACS Commander, and jump from the cockpit of their aircraft and into the seat of the AWACS controller.

Lock On also allows players to jump into the cockpit of other friendly aircraft that are flyable during the mission. In addition, players can start their missions already in the air, on the runway, or in the aircraft parking areas. For airbases with hardened aircraft bunkers, players will

FSW: From what we understand *Lock On: Modern Air Combat (LOMAC)* originally started out as an add-on for *Flanker 2.0*. But a lot of stuff happened between then and now. *Flanker 2.0* was an SSI or Mattel Interactive product, and now your development team and the project is part of Ubi-Soft, and what was once an add-on for *Flanker 2.0* is now a separate product. So, could you please fill us in on what *Lock On* will be now, and what it was initially to offer in detail?

MW: When I came on board, back in December 2001, the title was termed *Flanker Attack* and the plan was to add the Su-39 and A-10 to the stable of aircraft already introduced in *Flanker 2.0/5*. Other than that, I'm not quite sure; I'm afraid that that was before my time. There are three primary goals for *Lock On*.

First, the audio environment of *Lock On* will accurately recreate the world of a modern jet fighter pilot. The audio environment can be divided into two areas, sound effects and radio speech.

Lock On will use a new sound engine that will recreate what it is like to sit in the cockpit of a combat jet.



Here's an idea of what Lock On will feature

Broad Scope

Lock On allows players to fly eight different combat jets in a conflict over the Black Sea region. Available to the player are several American and Russian ground attack and air superiority fighters. These include:

- F-15C Eagle
- Su-27 Flanker B
- MiG-29 Fulcrum
- A-10A "Warthog"
- Su-25 Frogfoot
- Su-39

In addition to these "focus" aircraft, players will also be able to fly the Su-33 "Sea Flanker" and MiG-29K "Sea Fulcrum" via *Lock On's* feature-rich mission editor.

Game Immersion

Paramount to making a great simulation title is creating a game-world that suspends the player's disbelief. The end goal is to create a gaming environment that enables players to experience the exhilaration and challenge of what it is to be a modern-day combat pilot. This is accomplished in several ways in *Lock On*, including graphics, audio, systems modeling, and missions.

Scalability

Traditionally, most simulators have either been study sims or survey sims. Study sims generally focus on a single aircraft with great detail, but they often sacrifice ease of play for new consumers; and survey sims generally include several flyable aircraft and intuitive gameplay, but they are often thin on depth. *Lock On* will merge the two, combining the depth and detail of a study sim, while still allowing the player to fly multiple types of aircraft and adjust their complexity levels.

Lock On will have the ability to scale gameplay to various levels. These range from the novice user to the expert. By using a comprehensive set of options, each player will have the ability to tune *Lock On* to match their expectations and what they consider "fun" in a title. These scalable areas include:

Avionics

Perhaps the most intimidating aspect of most high-fidelity flight simulations are the avionics (radar, heads up display, radar warning receiver, etc.). *Lock On* will offer two levels of radar sophistication. This choice will give freedom to the player to enjoy the game regardless of their gameplay style.

Flight Dynamics

Flying a combat jet can be a challenging task and it is *Lock On's* goal to scale the flight dynamics such that both the novice and expert user alike will be pleased. Options to scale the flight dynamics include extra-powerful engines, anti-spin control, and easy landings. If however the player selects the realistic flight dynamics, they will experience the most authentic feeling of flight ever created for a PC

simulation. The engine models contain real calculations for thrust and fuel consumption in regards to speed and altitude. *Lock On* also uses nonlinear, dynamic calculations to portray high angle of attack flight. Even advanced flight maneuvers such as the famous "Cobra" are possible in the Su27, Su-33 and MiG-29.

Labels

Lock On will give the player the option to place labels on objects in the game world like aircraft, ground vehicles, missiles, and ships. These labels will be visible at much greater ranges than the player can actually see the object.

AI

The skill of artificial intelligence controlled units will be scalable depending on the skill level of the player. At a novice level, the AI will pose little challenge and will allow even the most novice player the opportunity to achieve their first victory. On the most difficult level however, even a Top Gun graduate will be lucky to survive.

Weapon Effectiveness

Once a weapon has been fired at the player, *Lock On* will allow players to tune just how effective that weapon becomes.

Graphics

The *Lock On* world is designed to look as good from 30,000 to 10 feet off the ground. This is accomplished by using detailed terrain textures (based on satellite photographs), millions of trees, and countless cultural features such as villages, farms, railways, and many other types of objects that inhabit our world.

In addition to the Crimean peninsula, *Lock On* will also include portions of the Caucasuses. The Caucasuses is the region east of the Black Sea and is characterized by towering mountains and deep valleys.

Lock On's terrain is not just a great looking gaming background, but it is also a very complex compellation of individual objects that add to game play. The GIS (Geographic Informational Systems) technology used to create the terrain allows for the creation of different layers, each with their own properties. Such layers include roads, highways and railways, which are all seamlessly integrated together. With these layers, it is possible to assign ground vehicles to automatically navigate through a network of highways or rail lines and to use bridges to cross rivers. In fact, a damaged plane can even land on a highway.

All ground objects—such as buildings, factories, oil tanks, etc.—can be destroyed by a variety of weapons. Each ground object has its own unique set of characteristics including strength and type of secondary explosion. All objects will be rendered at a very high level of detail.

Airfields in *Lock On* are incredibly detailed and have their own sophisticated functionality. Airfields provide AI and human planes with navigational information, provide air traffic control, contain runways for taking off and landings, have hangars that aircraft start and end missions from, and consist of taxiways, command towers, and many other support buildings.

The 20,000 square kilometers of the highly detailed Lock On world contains:

- ➔ More than 16, 000 km of roads
- ➔ More than 2,400 km of railways
- ➔ More than 20,000 km of rivers
- ➔ More than 180,000 of buildings and other constructions
- ➔ More than 15,000,000 trees
- ➔ 21 cities
- ➔ 1,700 towns and villages
- ➔ 140 highway and railway crossings
- ➔ 500 bridges
- ➔ More than 7,800 electrical towers with connecting power lines
- ➔ 18 airfields
- ➔ 8 naval bases

In addition to the world objects, *Lock On* also consists of a massive number of airborne, naval, and ground vehicles. Each object is rendered in stunning detail with exacting articulation of everything from landing struts to moving tank turrets. In total, there are 322 different types of simulated objects in *Lock On*. These include:

- ➔ 56 different types of aircraft and helicopters
- ➔ 140 different types of missiles, bombs, and rockets to be used by aircraft
- ➔ 29 unique ships that range from aircraft carriers to tug boats
- ➔ 47 types of anti-aircraft missile and gun systems and early warning radars
- ➔ 50 kinds of ground vehicles that include tanks, artillery, and even everyday cars

Dynamic lighting effects will accent an already detailed world and will add an even more authentic touch. Lighting effects include specular lighting on objects, environmental lighting on the ground and in the atmosphere, and point source lighting from light sources such as a missile flame or strobe light. Combined, these effects create the best looking game world ever developed for a simulation product.

Just like the real world, *Lock On* will model various weather conditions. These can vary from clear days, to overcast, to thunderstorms. Depending on the conditions, the player may be flying through cumulous clouds, rainstorms, or fog. The variety of specific weather conditions is virtual endless.

Detailed Cockpits

Players will fly their jets from the most detailed and beautiful cockpits ever rendered for jet fighter simulation. Each dial and gauge is rendered in exquisite detail and authenticity reacts just as they do in the real jet. Each cockpit is rendered in exacting 3D and allows the player to effortlessly pan their view around the cockpit. This attention to detail also applies to the 3D models of every unit in the game.

actually start in the bunkers with the doors opening as they begin the mission.

Third is that *Lock On* is still in a relatively early state and aspects of the design are likely to change. Although I feel pretty confident about what I wrote above...things can change and often do in software development. It's the nature of the beast.

FSW: *With so many different planes to pilot, I'd imagine the variety of mission scenarios will be plentiful. So, what will the mission types be, and what will the campaign have to offer?*

MW: Even with the most accurate creation of a game-world, a successful title needs engaging missions. *Lock On* will provide a host of missions that cater to the players needs.

Lock On will include an extensive training module that places the player in the cockpit with a seasoned instructor. After completing the interactive training module, most players will never need to open the manual. *Lock On* will ship with at least 20 individual missions in different types of aircraft. Each mission will have its own background story and will be scripted to ensure maximum action and fun.

The Dynamic Battle Generator (DBG) is the focus of the mission system and allows endless replayability. When a player selects the DBG, they choose to either for a user created coalition of countries. Each mission the player flies will be unique and will allow the player to influence the progress of the war.

FSW: *Will players have to fly a campaign as either a US or Russian pilot, and will the player fly a single plane type through the campaign, or will they be introduced gradually to all of the planes types as they make their way through the scenarios?*

MW: Depending on the make up of the coalitions, players can choose to fly any of the flyable aircraft included in *Lock On*. We leave that choice open to the player.

FSW: *In the way of multiplayer options, what will Lock On have to offer, will we see the means to cooperatively fly missions with other players, or will it be strictly limited to head-2-head scenarios?*

MW: An easy-to-use multiplayer interface will be the central focus of *Lock On's* multiplayer features. Players have the option to go head-to-head or take part in cooperative play missions. Perhaps the most anticipated aspect of *Lock On* multiplayer will be the ability to have one side fly Russian aircraft and the other American.

FSW: What kind of immersion will we see in the way of ground activity; will we find a dynamic ground war going on down below as well?

MW: Although a continuous ground war the evolves from mission to mission is not planned for the dynamic battle generator, missions entailing the player to destroy moving, enemy ground units will be included.

FSW: The one thing that turned many people off in Flanker 2.0 was how very basic, and Windows Explorer-like the task of picking missions was. Will we see any improvement in the way of interface and interface design in LOMAC?

MW: Absolutely. The interface of Lock On is being redone from what was learned from the mistakes of Flanker 2.0. The menus of Lock On will ensure accessibility and ease of use.



FSW: I recall a few years back speaking with Carl Norman of SSI, and his plan was to make titles like Flanker 2.0 interface with titles like Destroyer Command and other SSI Air, Sea and Ground combat simulations, to create the ultimate Electronic Battlefield. With a new parent company behind the development of LOMAC, are there still any plans to work on integration on such a scale as previously planned with LOMAC, Flanker 2.0, Destroyer Command and other future titles?

MW: Not for Lock On but we hope to publish future products based on the Lock On engine that could integrate with each other.



FSW: Every simulation developer usually makes some claim about how their AI does this, that or the other, so what can we expect in the way of enemy and allied AI in LOMAC, and will we see anything new or improved upon over what's found today in Flanker 2.0?

MW: Building on the strong AI foundations of Flanker 2.0, Lock On will take everything two steps further. This ranges from how well aircraft dogfight, to how well they evade missiles, to tactics used when killing tanks.

FSW: Well, thanks again Matt for taking time out of your busy schedule to chat with us about LOMAC today, it sounds like a fantastic product, one that we'll all be looking forward to flying!

MW: Thank you Rod, I'm happy to help spread the good word!

For More Information

You can find more information on Lock On at the following Internet address:

<http://www.ssionline.com>

Looking & Running Cool



Ideas for Wrapping Up Your PC

By Rod White

When you get right down to it, most PC cases just aren't very pretty. Although most aren't meant to be, today there's no reason why you can't have a nice looking case that also just happens to keep your PC cool at the same time.

Today we're living in a day and age where our processor speed is now measured in GHz, instead of just MHz. The faster the processor speed, the more heat that is produced inside the case. In response to this, measures need to be taken to reduce heat.

I would personally recommend that, as a bare minimum, any PC running at 800MHz or faster, should have at least a few case fans inside running. Ideally, one pulling air in through the front, and another helping to draw air out the rear.

If you're running a 1GHz or faster CPU, the standard heatsink and fan alone aren't going to completely cut it. These days, video cards are shipping with RAM heatsinks as standard equipment, and that says a lot about how much heat is generated inside that PC enclosure of yours.

The video card, CPU, hard drive, system memory and the power supply all generate heat. And those *pain in the butt* ribbon IDE cables that populate most of the space inside

your PC are also a culprit. They can inhibit airflow inside the case by reducing the amount of air that most front case fans draw in over the video card, hard drive, and motherboard.

So today we're looking at a wide variety of cooling products and cases, most of which not only help to keep your PC cool and running in tip top shape, but that also just happen to look appealing as well. If you do a search on the Internet you'll find tons of vendors and websites dedicated to modifying your PC case. Many offer some fantastic cooling products, and a few even offer off the shelf, ready to go cases with enough cooling potential to keep a mad, overclocking maniac smiling from ear to ear.

Coolerguys.com PC Cases

First up are the guys at *Coolerguys.com*. They not only offer tons of PC components at great prices, but they also customize and sell their own line of PC cases.

The *Wind Tunnel Plus ATX Case Rev2* is one of their newer designs, and is one of the most affordable cooling options on the market.

The *Wind Tunnel Plus* is a mid-tower ATX case that features five fans total. Combined they produce 220+ CFM of air movement inside the case! Two of the fans are installed in the side of the case via laser cut blowholes, complete with grills over

top, which help to suck air into the case, right on to the CPU and video card.

Another hole is laser cut into the top of the case, where here it draws hot air out of the case, and it too features a nice grill over top the fan. So the case doesn't look like a hack job, it's all nice and neat. So much so that it looks like any other off the shelf case you can buy, only nicer looking due to the design.



The front bezel comes with either blue or champagne silver trim (your choice). In addition to the cooling functionality of the case, it's also a very nice ATX mid-tower case, which was very easy to install a motherboard into due to the removable motherboard tray.

Additionally the case is screw-less, as thumbscrews are all you need to twist to get inside. For an ATX case it's very attractive looking, and it offers four 5-1/4 bays and a total of five 3-1/2 bays, so there's more than enough room for components.

We also had it outfitted with an *Enermax Whisper 350* Watt power supply. At a little over \$200 delivered this is a fantastic case that isn't too aggressively styled, but provides the kind of cooling needed for today's 1GHz + systems.

Another popular model from CoolerGuys.com is the *Wind Tunnel II ATX Gamer*. This is a case that features two high speed 92x92x32mm, 55.1 CFM *Sanyo Denki* fans at 2,900-rpms for air intake, and three high speed 60x60x10mm, 21.19 CFM *Delta* fans at 4,800-rpms for the exhaust. This case offers about 173+ CFM of total air movement inside the case. But the real draw of this case is the front bezel, which features 2 built in USB ports, connections for your soundcard (even a volume dial for headphones!), joystick port and a PS2 Mouse port all on the right-hand side of the lower portion of the bezel.

There's a wiring harness included that is connected to the front bezel, which leads to a back plate where another harness is used to physically plug into your soundcard, USB ports and PS2 connector. This is a great feature for PC enthusiasts who are tired of reaching around the back of their PC to plug in a USB device (digital camera, scanner, joystick, rudder pedals, printer, etc), headphones, or a gameport gamepad when they're not using their joystick.

This case also features laser cut blowholes for the extra fans, with metal grills, and is a tool-less design. This one even features a finger ring, which makes removing the side panel even easier. If you look at it head-on at a glance, this case design is also even less aggressive in styling. It looks much like your average run of the mill ATX mid-tower case with some fans on top. So this is more ideal for the simulation enthusiast looking for not so aggressive styling, with adequate cooling and the plus of having the connections offered on the side of the bezel right up front.

Wind Tunnel Plus



Dragon Orb DRAGON ORB



Round Cables



Round Cables

Thermalake's ThermoEngine



Price-wise this case runs about \$10 more than the Wind Tunnel Plus, but for \$10 more it's worth it alone for the added ability to plug USB devices in on the front side of the case.

Antec SX635 Mid-Tower case

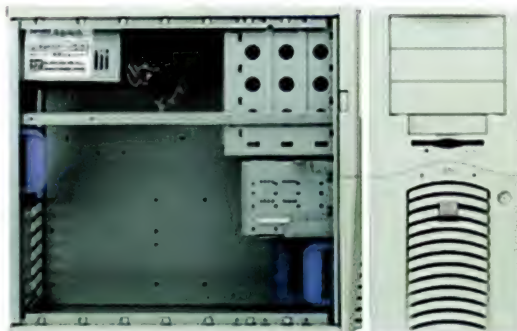
For some PC simulation enthusiasts on a tight budget, the *Coolerguys.com* cases may be a bit pricey, but all hope is not lost if you're looking for a basic off the shelf solution that's under, or around \$100 street price. *Antec* is a company that offers some very nice stock cases that offer decent cooling, and appealing, yet not aggressive exterior design.

The industry has definitely noticed the *Antec Performance* series of cases. We took a look at one of their Performance series full tower cases a few issues back, and the SX635 is essentially the little brother to the full tower SX840. The SX635 ships with an *Antec* 350 Watt Smart power supply, and is a mid-tower case, featuring three external 5-1/2 bays, two external 3-1/2 bays, and three internal 3-1/2 bays. This case also features a side panel that opens outward, swinging like a door, and even features a lock with a set of keys for it! Therefore, if you want to keep people off your case this is definitely the right case for the job.



(Above) The Wahoo Computers Viper case

(Right) Antec SX635 Mid-Tower case



I also like the drive rails that are included with the case. They really make installing and taking out drives a breeze. In terms of cooling, they include a single 80-mm case fan in the rear to draw heat out of the case. You can conveniently slip in another 80mm case fan in a spot in the front. Another place is available in the drive cage to mount an 80mm fan. I found these features to be very useful for keeping hard drives cool when combined with two additional *Antec* 80mm case fans.

You can definitely spend as much or more on another case and get less in the way of cooling features and functionality, and just more in the way of exterior looks. No matter how you look at it, the SX635 is a fantastic case for the money, and off the shelf you can't do much better than this.

Wahoo Computers Viper

If money is no object, then this is the case you absolutely must have. *Wahoo Computers* offers a complete line of custom cases, in different shapes, sizes and configurations, all of which can be customized via a nice dropdown menu online.

This case started out as one of the outstanding *Lian Li* ATX mid-tower cases, which retail for almost \$200. This all aluminum case has a fantastic brushed aluminum finish to it, and best of all, it's lightweight.

Installing a motherboard in this case was a complete joy. The entire motherboard tray, including the slots where your PCI/AGP cards go is one assembly that slides out, and is held in place by metal thumbscrews. Actually, the entire case is screwless. Even the power supply is held in place by a special plate that allows you to take it out using a few thumbscrews.

The Viper case has an added window to the side panel, and a green neon light inside complete with a power switch on the top of the case. There is also a top ventilation hole, with fan and grill on both sides to draw air out of the case. Air movement is facilitated by two high-speed intake fans in the front, and a fourth fan inside the rear of the case drawing air out. The window also features a laser etched "F-16 Viper" on it, and the case has a red "Remove Before Flight" tag too! This is truly the ultimate flight simulation enthusiasts' case!

Wahoo Computers offers a wide variety of other options as well, like different colored neon lights, control modules with lights on the front for your case fans, other laser etching options, other custom fan grills, fans, power supplies, etc. So while at \$350 this is definitely the most expensive case we've

looked it, it also happens to be the nicest of them all, and in the end you get what you pay for and then some.

Cool accessories

Maybe you already have *your* ideal case, but you'd like to help cool things down a little more. Or maybe you'd just like to accessorize a little. Rounded drive cables with their wide variety of colors is another new trend. They not only look nice but they also enhance airflow inside your case compared to the standard ribbon drive cables that clutter up things.

Over the years PC vendors have tried tying them up, binding them together, and making them look a little tidier overall inside there, but the fact remains that ribbon IDE cables are an eyesore, and they're keeping air from flowing properly inside your case. Rounded drive cables to the rescue! We've been looking at some rounded cables from *HighSpeedPC.com*, *Roundedcables.com* and *Coolerguys.com*.

We have cables that are red, blue, yellow and black ones; they all look identical to each other. They come in the form of ATA 66/100 IDE cables in 18-inch or 24-inch lengths, and as standard length floppy cables for single or multiple devices. They even make SCSI rounded cables, which are a little more expensive. On average they run about \$13-\$16 for the ATA 66/100 cables, and about \$13 for the rounded floppy cables. In terms of performance, I'm yet to see any drop in performance from using them. Therefore, it's safe to say that they're just as fast as regular ribbon cables, but with the added plus of allowing more air to flow inside your case (not to mention that they also just look nice inside too).

When it comes to heatsinks and fans, most PC users just stick with the standard units that come with their CPUs. Many other options are available; most of which are approved by CPU manufacturers.

The products from *Thermaltake*, at <http://www.thermaltake.com/>, are not only very useful in reducing heat, but also they look wild to boot. Some of their newest products include the *Dragon Orb*, which comes

in a few different configurations. The *Dragon Orb 3* features a copper base and a 7,000-rpm fan, where the *Dragon Orb 1* employs a 4,900-rpm fan with an aluminum base.

Thermaltake makes a variety of cooling products ranging from case fans to even ram heatsinks now. Their RAM heatsink kit is another cooling option to consider for your system memory, or your AGP video card. The RAM heatsinks also come in handy if you're overclocking your system memory or video card. The *Dragon Orbs* run about \$30 each, and the RAM heatsink kits can be had at around \$20, making them very competitively priced cooling products, all of which we found work very well.

Thermaltake also offers the traditional heatsink/fan combos as well, and their latest offering is the *Volcano II*, which is a hefty looking competitor and is clearly better than the average heatsink/fan combo that most vendors offer with OEM and boxed CPUs.

Another option worth pursuing is *Thermalake's ThermoEngine V6*. This is by far the most heavy-duty heatsink/fan combo that I've ever seen! The all aluminum block features a design unlike any other heatsink that I've ever laid eyes on, and by the look of things the fins really help to dissipate the heat, and to help promote cooling through the fins via the high-speed fan blowing down through them.

The *ThermoEngine V6* comes in a slick black anodized finish and features a blazing 6,800-rpm *Delta* fan, complete with a metal grill on the top to keep you from loosing fingers. This is a special modified version of the *ThermoEngine* that only *HighSpeedPC.com* offers. It's also competitively priced at about \$35 with other cooling products. Of all the heatsink/fan combos I've seen, this is definitely my favorite, and one of the best on the market.

So there's definitely more than enough options out there today to keep your PC looking, and running cool. What we looked at here is just the tip of the iceberg because these days the sky is the limit when it comes to what you can do with your PC exterior and interior to keep it cool.

Adding Power & Features To Your PC

The holidays are almost here, which means loads of new software will be out before you know it. Is your current machine up to speed? If not, it's a great time to upgrade to something better and faster. The last time out we filled you in on the best thing in CPU upgrades on a budget, by building a machine based on the *AMD Duron* 850 MHz CPU.

While more expensive than the now-standard PC133 MHz SDRAM, DDR memory is much easier to come by than *RAMBUS* memory, which is a requirement if you want to run a current *Intel Pentium IV* based machine. Pentium IV CPUs are still a lot more money than AMD Thunderbird and Athlon CPUs, and the fact remains that in most situations an AMD Thunderbird 1.4GHz machine is as fast, or faster than an equally equipped Intel Pentium IV 1.7 GHz machine.

Bringing Things Up To Speed

However, the latest *AMD Thunderbird* 266 MHz front-side-bus (FSB) CPU combined with a motherboard that takes advantage of DDR (Double Data Rate) memory is the way to go if you're looking for the ultimate performance. Expanding the processor bus speed (FSB) leads to faster data throughput between processor and RAM. This faster processor data represents a linear increase in speed on the system board.

DDR RAM

DDR memory is a successor to Synchronous Dynamic Random Access Memory (SDRAM) technology. DDR memory not only improves existing SDRAM technology, but with a 2.1GB/sec peak data rate, it can achieve memory transfer rates up to 100 percent higher than SDRAM. PC users can expect to receive better overall system performance, and will enable the AMD Athlon and Thunderbird processor platforms to deliver new levels of performance on graphics-intensive software, like flight simulation, with minimal effect on system costs.

So currently, a DDR memory equipped 266 MHz FSB AMD Thunderbird systems is the most economical choice for power users. Now our aim is to not build the most affordable machine. We try to suggest the most affordable high-end components in some areas so that we can afford to go all out in other areas.

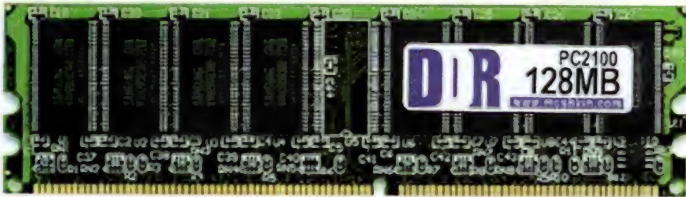
At press time, the 1.2GHz Thunderbird 266 MHz FSB CPU runs a little under \$100. Chances are that by the time you read this they will be even less. Oddly enough, we found many online vendors selling the 200 MHz FSB version of the 1.2GHz Thunderbird CPU for more than the 266 MHz FSB version. So, it's actually cheaper in most cases to get the better CPU!

The other good news is that PC2100 DDR memory DIMMS run about \$35-\$40 per single 256MB DIMM (at press time)! PC2100 DDR memory, and PC2100 modules provide 2.1Gb/sec (8 bytes x 266 MHz = 2.1 GB/sec) of bandwidth, which is why it's called PC2100.

Now is definitely a great time to consider upgrading your motherboard, stocking up on the megabytes, buying a faster and bigger hard drive and a battery backup system.

Rod White

Now is definitely a great time to stock up on the megabytes. We looked at 256 MB of PC2100 DDR high-performance memory from *Mushkin* (supplied by *HighSpeedPC.com*), which is PC2100 DDR memory that is guaranteed to run reliably when tweaked at optimal settings in the BIOS. For a little less price-wise, with equal performance when running at spec and when tweaked, we found that *Crucial.com* provides fantastic DDR PC2100 memory too (even FREE FedEx 2nd Day shipping!). We tried modules from both *Crucial* and *Mushkin* and found that both work very well. So you really can't go wrong with either brand, and it's best to avoid generic memory.



Mushkin DDR-PC2100

Upgrading your motherboard

These new 266 MHz FSB CPUs do require a motherboard that supports them, and most also support DDR system memory. We've been looking at motherboards from *MSI*, *Shuttle* and a few other manufacturers, and currently both the *MSI* and *Shuttle* offerings are two of the best options on the market for this machine we built. It was hard in selecting which motherboard to go with, so we decided to suggest either one of them, based on your needs.

Like the *MSI* board, the *Shuttle AK-31 v.2* is also recommended by AMD, and it offers a host of great options. Price-wise the *AK-31 v.2* from *Shuttle* is a little more affordable than the *MSI K7T-266 Pro R*. The *AK-31 v.2* runs about \$99-\$110, where as the *MSI* board runs about \$120-\$130+.

However, the *MSI* offering does have a few features that the *Shuttle* board does not. This explains it's higher price tag. For instance, the *MSI K7T 266 Pro R* features an extra header bracket for two more USB ports, plus USB 2.0 compatibility. It also has an interesting PC2PC USB network feature/cable for connecting with another PC and ATA-100 RAID support onboard.

Both boards boast a slew of tweaking/overclocking features in the BIOS. The *AK-31 v.2* features one more DIMM socket and one more PCI slot over the *MSI K7T 266* board. Either way you look at it, you can't go wrong with either board, as both provide outstanding performance.

Bigger and better hard drives

Choosing a hard drive is just as important as choosing a CPU or motherboard. Just about every thing you do is run from your hard drive. Most people will try to buy the biggest drive that they can, for the least amount of money. This is the *worst* way to choose a hard drive.

Most big drives these days are very inexpensive. By big we mean 60GB-100GB storage size, usually at 5400 RPM (the speed at which the drive spins). Our best suggestion is that you *do not* opt for a 5400-RPM drive. In most cases, the 7200-RPM version is just \$10 more, which is \$10 well spent in terms of performance.

Having said all that, we selected the *60GXP* 40Gigabyte 7200-RPM *ATA 100* drive and *60GXP* 60GB drives from *IBM* for this project. They are very reliable, very fast, and they are designed more efficiently than most 40 GB and larger drives on the market today, due to the use of 20 GB platters.

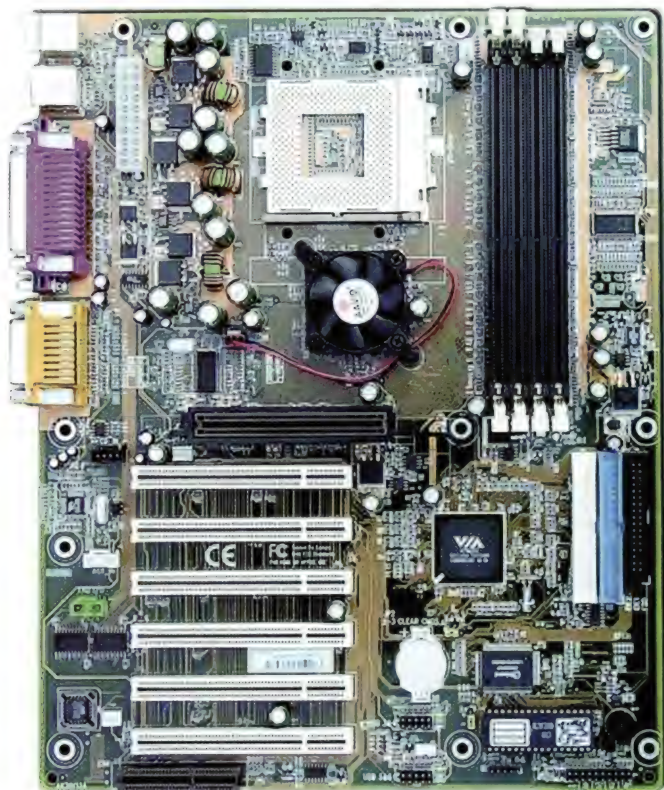


The IBM 60GXP

At around \$110 each the *60GXP* 40GB *IBM* drive is a wise choice, and the 60GB version is just as economical, without forsaking performance for space, at around \$150. We set up the two 60GB drives (supplied by *Coolerguys.com*) in a RAID 0 configuration (Redundant Array of Independent Disks), which essentially offers blistering fast performance- about 40% faster than without RAID 0. This is accomplished by *stripping*, or writing data across both drives at once while being recognized by the OS as a single 120 GB drive.

A *Promise FastTrak Tx2* RAID controller was also used for the RAID array on the *Shuttle AK-31* motherboard. I should also add that the RAID controller on the *MSI* board also works just fine, but I personally prefer to use stand-alone components when I can. This is why I opted to use

the *Shuttle* board and the separate Promise controller card together. However, you can get the same degree of performance out of the MSI board in a RAID 0 array, because it also uses a Promise Raid controller on-board. If you'd rather save even more money, the 60GXP 40 GB drive is the ideal solution. It has a decent amount of storage space without the added cost of a RAID controller and a second hard drive.



Shuttle AK-31 motherboard

CD writing capability

A CD-RW drive, or burner as they're commonly called these days, is another must-have feature for many PC enthusiasts. We opted for the *Yamaha 20x/10x/40x* drive, which writes CD-Rs at a blistering 20x speed, CD-RWs at 10x speed, and reads CDs at 40x speed.

At around \$200 it's not cheap, but you get what you pay for and then some. It comes bundled with the award winning *Nero Burning Rom* software, and is one of the best IDE burners on the market today.

Another noteworthy drive is just hitting the market right now from *Plextor*. It is the *Plexwriter 24X/10X/40X* drive, which runs a little more price-wise, but also offers Burn-Proof technology and a faster write speed of 24X.

Battery Backup

Other items you should consider include a power surge/battery backup, like the *APC Battery Backup 500va* or the *Belkin Regulator Pro USB 650va*. I previously used an *APC* backup for the past 7 years, and couldn't see ever going without one now. Both the *Belkin* and *APC* options are worth their weight in gold when your power goes out, and can provide up to 45 minutes worth of power to your PC and components.



APC Battery Backup 500va



Yamaha 20x/10x/40x drive

These solutions also help to protect you from power surges and brownout, which is essentially a situation where you're not getting enough power. Both also offer USB monitoring, via a USB cord and software that's provided, and run about \$100-\$120 respectively.

The main difference between the two is that the *Belkin* option offers more power and 8 outlets, four

of which are backup/surge outlets, and the other four that are just surge protected. The APC option features four backup/surge outlets, and three surge protected only. If those options are a little out of your price-range, at the very least I recommend an option like the *APC Surge Arrest: Surge Station*. While it's not a backup, it does offer surge protection via eight electrical outlets, two telephone outlets, and it's 100 times better than those so-called surge protectors that you can get at K-Mart on the \$6-\$10 blue light special.



APC Surge Arrest: Surge Station

Managing your USB devices

With more and more USB devices out there today, even the four connections provided by the MSI motherboard is not enough for some users. In this case I would recommend the *Belkin Bus-Station 7-port USB hub*. The nice thing about this unit is that it's powered, modular and you can switch out the modules to add others like a serial port adapter, network card, PS2 ports. It even has a 4-port USB Switch that would allow up to four PCs to use a single USB device. The possibilities are endless with this thing, so it's the ideal USB hub to start with, and later on it can add so much more to your PC via its single USB connection. In terms of USB hubs it doesn't get much better than this. The unit runs about \$59 online if you shop around.

Sure if you wait, you can always get stuff cheaper. But then again, by the time the next big thing is out, that cheap stuff you got doesn't sound so great anymore. So set a limit on what you're going to spend, assume that you'll spend about \$100-\$200 more than that, and take it from there.



Belkin Bus-Station 7-port USB hub

Wrap up

I think we've given you a good idea in terms of what's out there, what's essential and what else you can add. The right components make all the difference, which is why we carefully selected the items that we covered in this article.

With PC components these days, you definitely get what you pay for. Sure if you wait, you can always get stuff cheaper. But then again, by the time the next big thing is out, that cheap stuff you got doesn't sound so great anymore. So set a limit on what you're going to spend, assume that you'll spend about \$100-\$200 more than that, and take it from there.

Also, don't be afraid to shop around online. As much as I hate to take business away from the hometown computer shops, the fact remains that most just can't come close to competing with the prices online vendors have to offer. Check *Pricewatch.com*, and look to places like *NECXDirect.com* and any of the other vendors that we mentioned in the article for your upgrading needs.

This way you can find the best prices, on the best products online. Chances are that even after paying shipping you'll still come out ahead compared to shopping around locally. So shop around!

NVidia's New Flagship Video Card

GeForce 3

By Rod White

In the realm of 3D-accelerator cards, we usually see a technological leap only once every nine months to a year. In between we see tweaks to existing technologies, and re-released cores with faster memory or higher core clock speeds. The GeForce 2 MX as the GeForce 2 MX-200 and MX-400 by NVidia are good examples of this. What was hot six months ago usually sports a much more affordable price tag now.

There hasn't been any Earth shattering developments yet in 2001, but the GeForce 3 is now among us, and it's NVidia's new flagship Graphics Processing Unit (GPU), and as far as technological leaps, the GeForce 3 is definitely it.

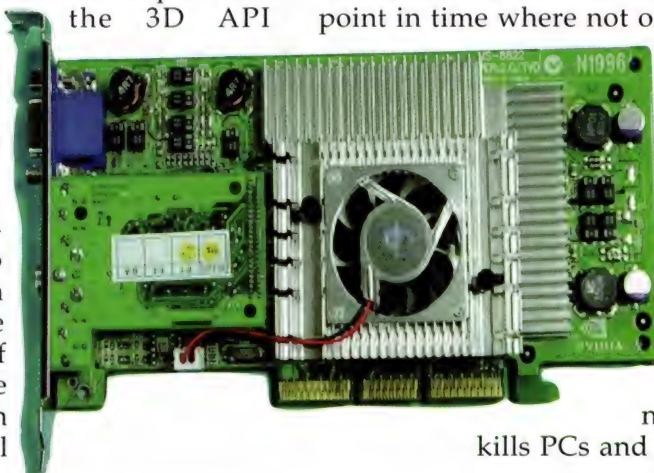
Microsoft's DirectX 8.0 allows programmers the means to manipulate graphics processors like never before. NVidia's GeForce 3 is the first mass consumer-level product that takes advantage of this capability in hardware form.

In the past, the game/simulation developers had to work around any limitations the 3D API (Application Programming Interface) or video card presented them with. This is also the first truly new GPU from NVidia in years.

The GeForce 3 chip is brand-new technology, and is made up of 57 million transistors. When you think about it, that's more than twice the number of transistors found in the GeForce 2 GPU, and it's still more than what you'll find in an Intel

Pentium 4 or Athlon CPU! So, we've finally reached a point in time where not only do video cards have as much memory on board as entry-level PCs. However, the video card GPU has as much horsepower as the CPU now!

Heat was another issue that chip developers have faced time and again. Usually the faster the chip, the more heat it generates. This is a big no-no in your PC case, as heat kills PCs and PC expansion cards (video



cards, sound cards, etc). Chip manufacturers are continually downsizing the chips themselves to eliminate this problem as much as possible, and this new GPU is built on a .15-micron process, so heat isn't really an issue at all now. So with a smaller die to work with NVidia was able to stuff in boatloads of transistors, without upping the degree of heat generated.

A look under the hood

The nfiniteFX™ engine is NVidia's biggest technological breakthrough yet, which is the star of the GeForce 3. The nfiniteFX engine essentially consists of programmable vertex shaders and pixel shaders. The vertex shaders allow developers to add some expression to 3D characters, like the means to add facial expression and wrinkles in the skin, as a mouth would utter words.

Developers now have the means to make some amazingly lifelike looking skin and hair for 3D creatures and people in general when both the pixel shaders and vertex shaders are used together. In short, vertex shaders are little programs that perform operations on the geometry.

The pixel shaders work a little differently, as they handle complex lighting tasks like bump mapping, EMBM, volumetric lighting effects, specular lighting, and many other complex tasks that can now be done in hardware, leaving the PC CPU alone to handle other tasks. In the end, the pixel shaders help to give us the depth and illusion that a flat object has bumps and true texture. So essentially pixel shaders are similar to vertex shaders, but instead of processing geometry data, they handle texturing and shading on each individual pixel.

With the GeForce 3, developers finally have the means to render the most complex and realistic looking scenes. The result is an object that has real depth too it, realistic skin textures, and lighting that looks just as it would look in the real world. This improves the illusion of depth and renders curves and lines accurately, not just as hand drawn flat lines as before.





5:31] SA-13 Gopher destroyed by AH-64 Apache



*Images above:
Enemy Engaged on the GeForce 3 with Anti-Aliasing
enabled*

*Previous page:
USAF with FSAA enabled as well on the Starforce 822*



*Image from a soon-to-be-released soccer title that shows
how well facial hair and expressions will be with the
GeForce 3*

When a scene is rendered this way, you can be fooled into thinking you can put your hand up under a wheel well, almost as though you can feel the seams where the hood meets the body. Faces can also have individual facial hairs now; dinosaurs or creatures can have lifelike skin that is so real looking that it really looks cold and clammy.

Full Scene Anti-Aliasing (FSAA) is another feature that we were all introduced to a little over a year ago now via the now defunct 3DFx cards, and NVidia's GeForce 2 GTS. The GeForce 3 introduces a new means of FSAA support in the way of "Quincunx Antialiasing." This new means of FSAA offers much better sampling, in some instances even better image quality than traditional 4X sampling, with the performance hit more like that of 2X FSAA. The result is far better image quality, without the performance loss that we've seen in the past to obtain it. Best of all this is a feature that all of your current and future titles can take advantage of. NVidia is also calling this HRAA (High Resolution Anti-Aliasing), so essentially HRAA is another acronym for FSAA.

The biggest bottleneck for graphics card developers is memory. There is some very fast DDR memory on cards today, but the reality is that we're at a point in

time where the GPUs can outpace the memory. So NVidia came up with a solution to help enhance the GeForce 3. The "Lightspeed Memory Architecture" is NVidia's bottleneck breaker, and it utilizes what NVidia is calling the "Crossbar Memory Controller."

The GeForce 2 GPU had one memory controller 256 bits wide. The GeForce 3 has four memory controllers onboard now, each 64 bits wide, equaling the same number of bits, but it manages the memory more efficiently. In most cases, a GeForce 2 wouldn't even use the entire pipeline to process an instruction. It might be using just 64 bits of the 256-bit pipeline. However, it had tied up the entire pipeline for that one 64-bit instruction. Therefore, more 64-bit instructions can be waiting in line on a GeForce 2, thus wasting time and memory bandwidth by tying up the entire pipeline.

By splitting the pipeline into four 64-bit controllers, the GPU of the GeForce 3 can use the entire pipeline for a single instruction. On the other hand, it can handle up to four separate 64-bit instructions all at once, thus handling the memory far more efficiently! Based on this, they needed to develop new memory to handle this more efficient method of processing.

Like the Evil Kryo from PowerColor that we looked at a few issues back, the GeForce 3 renders only what it needs to produce a scene, which in itself helps greatly. NVidia claims that this design is 400% more efficient than the GeForce 2 design.

Oddly enough, the GeForce 3 runs at a 200 MHz core clock speed, with 230 MHz DDR (Double Data Rate) memory. This means you actually have 460 MHz memory speed. The core clock speed is really slower than a GeForce 2 Ultra by 50 MHz, and equal to about the same speed as a GeForce 2 GTS with 64MB DDR memory. But although the core clock is slower, it actually has a lot more horsepower than even a GeForce 2 Ultra with 64MB DDR memory.

Finally, the GeForce 3 includes a few more enhancements in the area of DVD playback. The addition of motion compensation and vertical filtering, among other features, really help to make the GeForce 3 a nice card for DVD playback now.

In most benchmarks, we've seen results are in the 20%-30% faster range over a GeForce 2 Ultra card. When more DirectX 8.0 games arrive on the scene that performance gap will get even bigger, in favor of the

Here's all the techno-babble/specs from NVidia of the GeForce 3

- ➔ nfiniteFX TM engine for full programmability
- ➔ Lightspeed Memory Architecture for unmatched performance
- ➔ Surface engine for high-order surfaces and patches
- ➔ Programmable vertex shader
- ➔ Procedural deformations
- ➔ Programmable matrix palette skinning
- ➔ Keyframe animation interpolation
- ➔ Morphing
- ➔ Fog effects (radial, elevation, non-linear)
- ➔ Lens effects (Fish eye, wide angle, Fresnel, water refraction)
- ➔ Programmable Pixel Shader
- ➔ Phong-style lighting for per-pixel accuracy
- ➔ Dot3 bump mapping
- ➔ Environmental bump mapping (EMBM)
- ➔ Procedural textures
- ➔ Per-pixel reflections
- ➔ HRAA—high-resolution antialiasing
- ➔ Featuring Quincunx AA mode
- ➔ Integrated hardware transform engine
- ➔ Integrated hardware lighting engine
- ➔ DirectX ® and S3TC ® texture compression
- ➔ Dual cube environment mapping capability
- ➔ Reflection maps
- ➔ Accurate, real-time environment reflections
- ➔ Hardware accelerated real-time shadows
- ➔ True, reflective bump mapping
- ➔ Z-correct bump mapping
- ➔ Phong-style lighting effects on bump maps with reflections

GeForce 3. On average a GeForce 3-based card will run \$350-\$400+, which makes it a *very* expensive investment. However, it is a lot cheaper than a new GeForce 2 Ultra was when first released. That's actually good price-wise, considering originally the GeForce 3 was slated to debut in the \$500-\$600+ range.

The MSI Starforce 822

The new GeForce 3 GPU drives MSI's newest heavy hitter, the Starforce 822. It's outfitted with Elite MT 3.8 nanosecond 64MB DDR memory that runs at a 200 MHz core /460MHz memory clock speed. It also features a 9-blade fan and heatsink on the GPU itself.

The version we got included the TV-In/TV-Out module, with composite in and out, and an extra S-video-Out jack, with cord. Bundled with the card is a copy of MSI's outstanding DVD player, *MSI DVD* and *MSI 3D!Turbo 2000*, which allows you to tweak the core and memory clock settings of the card.

As for software you get a copy of *Ulead* video editing software and *Dronz*, which is one of the first DirectX8.0 games to surface.

Installation is very straightforward. Simply prepare for the swap, uninstall your previous adapter, and then toss this one in. Everything needed is right on the installation CD, so as usual it was a walk in the park.

Once up and running we put it through the ringer in various games and simulations under various FSAA (Full Scene Anti-Aliasing) settings. The new Quincunx mode essentially falls in between 2X and 4X sampling, and that's right where you'll find it in the options.

The biggest bottleneck for graphics card developers is memory. There is some very fast DDR memory on cards today, but the reality is that we're at a point in time where the GPUs can outpace the memory. So NVidia came up with a solution to help enhance the GeForce 3. The "Lightspeed Memory Architecture" is NVidia's bottleneck breaker, and it utilizes what NVidia is calling the "Crossbar Memory Controller."

- ➔ High-performance 2D rendering engine
- ➔ Optimized for 32-, 24-, 16-, 15- and 8-bpp modes
- ➔ True-color hardware cursor with alpha
- ➔ Multi-buffering (double, triple or quad) for smooth animation and video playback
- ➔ High-quality HDTV/DVD playback
- ➔ High-definition video processor (HDVP) for full-screen, full-frame video playback of
- ➔ HDTV and DVD content
- ➔ Independent hardware color controls for video overlay
- ➔ Hardware color-space conversion (YUV 4:2:2 and 4:2:0)
- ➔ Motion compensation
- ➔ 5-tap horizontal by 3-tap vertical filtering
- ➔ 8:1 up/down scaling
- ➔ Per-pixel color keying

- ➔ Multiple video windows supported for CSC and filtering
- ➔ DVD sub-picture alpha-blended compositing
- ➔ Operating systems: Windows 2000 Windows NT (all) Windows 98, Windows 95 - Linux - Mac OS
- ➔ API support: - OpenGL 1.2 and lower - DirectX 8.0 Version 1.1 and lower
- ➔ Performance: - 3.2 billion AA samples per second fill rate - 7.36GB/sec memory bandwidth - Lightspeed Memory Architecture amplifies memory bandwidth
- ➔ Compatibility - NVIDIA Unified Driver Architecture - Fully-compliant professional OpenGL 1.2 support for all Linux™ and Windows operating systems - WHQL-certified for Windows 2000, - Windows NT, and Windows 98 - Complete Linux drivers - Mac OS



A dinosaur shot of the GeForce 3 in action from an upcoming DirectX8 title, showing off the detail

Performance-wise, it does look almost as good, if not, just as good as 4X mode, but with the performance hit of only 2X sampling, making it my current favorite choice in the way of FSAA settings. Titles like *Combat Flight Simulator 2*, *FS2000*, *Mechwarrior IV: Vengeance*, *NASCAR Racing 4*, *Quake III*, *Typhoon* and everything else we threw at it looked outstanding. We were able to run them all of them at much higher resolutions than before, with stunning frame rates, even with FSAA enabled.

Unfortunately there are hardly any DirectX 8.0 titles on the shelves now to truly show off just what this card can really do. None of the current titles really take advantage of the pixel shaders and vertex shaders to the fullest. As for overclocking the card and stability – we were able to boost the core and memory clock speeds up a little, but that was overkill, so most of the time we ran it stock, and the entire time we hadn't one problem with the card.

However, the added horsepower of the *Starforce 822* over a GeForce 2 Ultra made playing *Enemy Engaged: Comanche Vs. Hokum* a whole new experience at 1600x1200 32-bit color with Quincunx FSAA enabled. With all of that detail it was still smooth as silk! Plus the older *Apache Havoc* models, which were also installed, were smooth and jaggie-free, making them look as fantastic as the newer Comanche and Hokum 3D-models in the simulation.

Jane's USAF is another older title (but one that I still enjoy immensely) that really benefited from this card, as at the highest resolution setting it not only looked absolutely grand, but was faster than ever before (not that it was slow to begin with), with even 4X sampling FSAA enabled.

More Information

You can find more details at the MSI website:

<http://msicomputer.com/>

This is a fantastic card, and the price is what's also pretty appealing, more so if you don't already have a GeForce 2 Ultra card.

...What the future may bring is where the GeForce 3 and the Starforce 822 will really shine. So this is one of the first video cards to debut that you can feel confident in knowing that it won't be outdated in six months time, plus it's one of the only ones to include the Video-In/Out module.

Conclusion

This is a fantastic card, and the price is what's also pretty appealing, more so if you don't already have a GeForce 2 Ultra card. At \$350 it's competitively priced, but if you already have a GeForce 2 Ultra card that you paid \$450 for just six months ago it might be hard to justify the cost.

In addition, the performance gain in most cases is about 20%-30%, which is substantial, but not earth shattering over a GeForce 2 Ultra. But that's putting a GeForce 3 against a GeForce 2 Ultra in today's titles. What the future may bring is where the GeForce 3 and the *Starforce 822* will really shine. So this is one of the first video cards to debut that you can feel confident in knowing that it won't be outdated in six months time, plus it's one of the only ones to include the Video-In/Out module.

Cockpit Control System from GoFlight

The usual format for a cockpit control systems is either as in an integrated combination system with a yoke or as a fixed stand-alone cabinet with a given set of controls/readouts. The GF-AC rack mounting system offers quite a bit more flexibility and functionality than these other systems. This is a definite plus as you'll see in this review of the Cockpit Control System from GoFlight.

Every flight simmer has experienced the "mouse operation overload" dilemma when working the panel controls on the screen. Particularly during final approach, when things tend to get a bit hectic anyway. And of course, the subject of maximizing your outside view by making use of multiple monitors, thereby splitting up the panel controls and the view out the windshield, has been germane to flight simming for quite some time now.

The biggest problem in using multiple monitors is (1) cost and (2) desktop space. Even at bargain basement prices, another monitor will run at least \$250.00, and that additional monitor's footprint will have a significant impact on your available workspace. However, even if you introduce multiple monitors to your flight sim desktop, the problem of *mouse operation overload* is still there.

The primary cause of this is overload comes from having to pick up the mouse, then employ some of that virtual hand-eye coordination and work the switches and knobs on the screen in the first place. It's a lot easier to perform these tasks in a real-world environment than it is on a video screen with a mouse. That's why some people (not me) prefer to stay with using keyboard commands like we all did in the "old days."



The GoFlight GF 45 module

A good solution to this dilemma is to integrate an actual cockpit control system into your flight sim desktop instead of, or in addition to, your multiple monitor configuration. A cockpit control system will provide you with physical electronic modules/controls for your radios and panel switches, in place of having to manipulate their virtual representations on the simulator display. We have examined several of these in previous issues, and this time around we will be looking at the GF-AC Cockpit Control System from GoFlight.

Reviewed by Tim Dickens

does offer you some degree of flexibility on just how you can use it. You can also buy additional blank faceplates, in case you decide not to purchase the full compliment of modules to fill the entire rack.

Assembly and installation

The GF-AC rack mounting system comes with a complete set of instructions, and assembly was quite simple. Even for a guy with ten thumbs like me. It comes complete with all of the hardware necessary to perform the task, and a hex tool to put it all together with a very professional look.

The individual modules integrate with your system via USB (Universal Serial Bus) connection. So if you will in fact be using a number of different modules, you will need to have enough USB ports to accept them. Therefore, you may need to go out and get a USB hub to connect everything.

There is no technical/performance drawback to connecting this number of separate USB devices. This is one of the big advantages of USB in the first place. But you will need to be able to physically make the individual connections, so I suppose this could be considered a drawback to the modular approach. However, I honestly do not consider this a problem myself.

Operation of the system

The GoFlight system uses the GF-45 module as the foundation of its system. As I mentioned before, the GF-45 module can be purchased in separate stand-alone 4" high enclosures, rather than as rack-mounted modules that we are using here. GoFlight also offer a panel toggle switch and pushbutton modules for the GF-AC rack mounting system.



The GF-AC Modular rack-mounted system

The GF-45 module is a software configurable device. You can use the GFConfig software to

Physical footprint

The GF-AC system consists of a mounting rack onto which you can add a variety of different control modules. This rack-mounted modular system offers you a great deal of flexibility, rather than simply having to accept the full compliment of components and configuration that the manufacturer makes available. This is something I like very much.



The GF-AC mounting rack

The majority of this kind of equipment typically offers more than I want, or is put together in a case that just does not fit where I need to put it on my desktop. This modular design would allow a lot more flexibility if a variety of different mounting racks were offered. So that you could split up the components on either side of your monitor, or in any two locations on your desktop, rather than being forced to make room to fit one single (and large) cabinet/frame.

Space ends up being one of the primary problems a virtual pilot faces when attempting to upgrade the quality and functionality of his/her components, so this is a suggestion I have to GoFlight to make this system more attractive. Different sizes of mounting racks would be a big plus. GoFlight does, however, offer some of the modules in separate, self-enclosed units that you can "stack up" any way you like.

The design of the one rack offered with the GF-AC system allows you to either stand it up on your desktop, or lay it flat with an angular face panel, which

designate each individual module as a COM, NAV or ADF radio. It can also serve as the display for a transponder, a general-purpose instrument panel control, or a 6-function autopilot. The software allows you to designate the modules in any combination of these, or make all avionics functions available using a single GF-45 module. The software, therefore, offers you a lot of flexibility, and it is very easy to use.



The GFConfig software allows you to configure the modules and switches however you like, enhancing flexibility

The GF-P8 pushbutton control module has 8 programmable pushbuttons and LED indicators. You can assign the functions with the GFConfig software, and label the buttons using stick-on labels included with each unit. You can use it for panel switches, autopilot functions, or any number of things. The GF-T8 toggle switch control module is much the same thing, only using toggle style switches.



The GF-P8 pushbutton module



The GF-T8 toggle switch module

So you can buy as many modules as you like, and configure the system any way you like. Whatever feels most natural to you. This is quite an important consideration when you are sacrificing this much money and desktop space for a cockpit control system.

The advantage of the tactile feel of physically operating the controls, and the additional functionality this offers, can only be fully realized if the fundamental setup seems natural to you. This is how you *really* defeat "mouse operation overload."

Conclusion

The usual format for a cockpit control systems is either as in an integrated combination system with a yoke, or as a fixed stand-alone cabinet with a given set of controls/readouts. The GF-AC rack mounting system offers quite a bit more flexibility and functionality than these other systems. This is a definite plus. In my opinion, it would be an even *bigger* plus if more variety of mounting racks were available. However, even as it sits now, the GF-AC system is still your best choice in my opinion.

If price is your sole consideration, then you still have a quandary. The GF-AC system prices out at about \$580, if you go full-bore. This makes it very competitively priced, but not an *El Cheapo* alternative by any means. As I mentioned before, the two big roadblocks that a flight simmer faces when creating a desktop-based cockpit system are price and space. However, in my opinion, if you have the space, and are willing to turn over the greenbacks to beat the *mouse monster*, this is a very good solution for you.

GF-AC Cockpit Control System Components

GF-AC Module Rack	\$99.95
GF-45PM Display Panel Module	\$99.95
GF-P8 8 Pushbutton/LED Module	\$89.95
GF-T8 8 Toggle Switch/LED Module	\$99.95

GF-AC Accessories

2" Module Bay Cover	\$9.95
GF-AC Cable Organizer Kit	\$14.95
GF-45PM Panel Mount Conversion Kit	\$12.95

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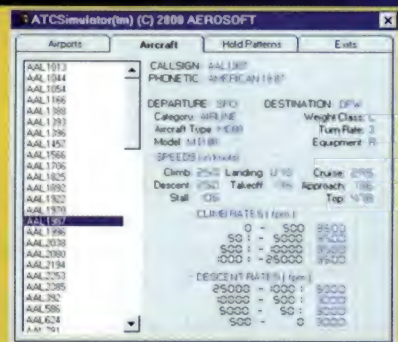
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Product Reviews

In-depth reviews of the latest software, hardware, utilities and more for FS 2000, Combat Flight Simulator and Combat Flight Simulator 2.

Reviewed this issue: Falcon 50, Harrier Jump Jet, Great Britain & Ireland, Korean Combat Pilot

Falcon 50 CAEA

Aircraft and Panel for Microsoft Flight Simulator 2000

Reviewed by Doug Horton

My download folder has been home to hundreds (probably thousands) of Zip files of various flight simulator aircraft, panels, scenery and utilities during the eleven years I've been "simming." Once in awhile, I download something absolutely spectacular, and the Falcon 50 CAEA by Yannick Lavigne, Fred Banting and Rob Young is one of these!

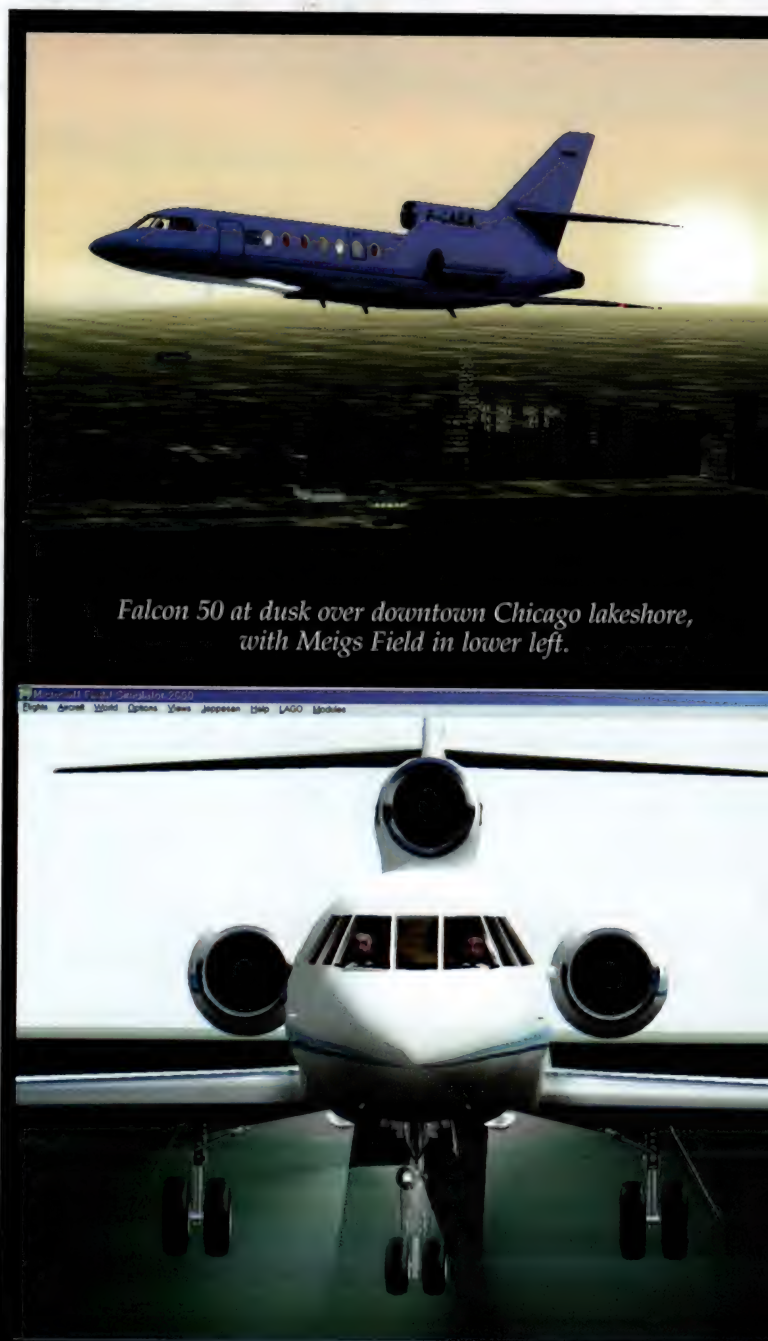
Feast your eyes on the degree of detail in Yannick's aircraft design, and the realistic gauge and system detail in Fred's panel. Experience the realism of Rob's flight model. Altogether, a very polished add-on package.

The Aircraft

Conservatoire de l'Air et de l'espace d'Aquitaine (CAEA), which helped sponsor the project, is a nonprofit association in France of which Yannick is a member. The CAEA is situated at the Bordeaux-Mérignac airport, hosted by the French Air Army, and near the Dassault Aviation factory. Their activities include preserving and restoring air heritage coupled with both its airplanes and document collections. This model is based on the early release of the Falcon 50, as the CAEA owns the 1976 number 1 fuselage "Spirit of Lindbergh."

Yannick Lavigne lives in Bordeaux, France. He's a graphic designer and professor at the Fine Art School of Bordeaux. It's obvious that he's been using computers for his job and hobbies, as the visual modeling of the aircraft is stunning! To help users who are "framerate-challenged," Yannick has provided two models of the aircraft. Yannick reports that there are over 12,000 polygons in the "standard" model and over 7,000 polygons in the "light" model. After you see the smooth

View from forward, looking inside the cockpit of the Falcon 50.



Falcon 50 at dusk over downtown Chicago lakeshore, with Meigs Field in lower left.



Yannick Lavigne's aircraft design has 12,000 polygons for smooth contours of all surfaces.

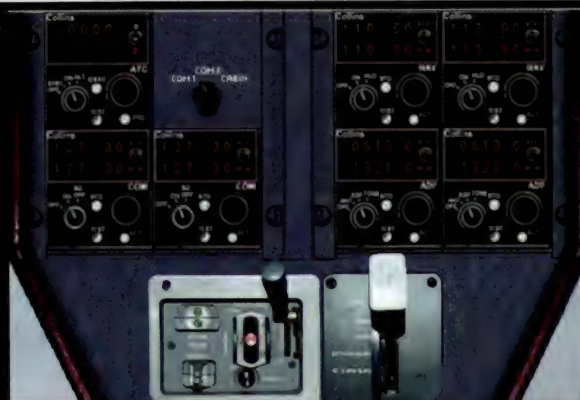
exterior contours and features, as well as the amazing interior appearance, you'll appreciate the work he put into this.

Yannick has also provided an amazing visual treatment of the wood and leather furnishings of the aircraft interior. What's most interesting is how you can see a zoomable interior perspective from the rear of the cabin by cycling the **S** key while the engines are off and the aircraft is parked. If the airplane is operating, the views cycle normally from panel to exterior views. Look into the aircraft from the front and you'll even see the map on the aft partition, while if you look from the rear of the cabin forward, you'll see the cockpit and control panel.

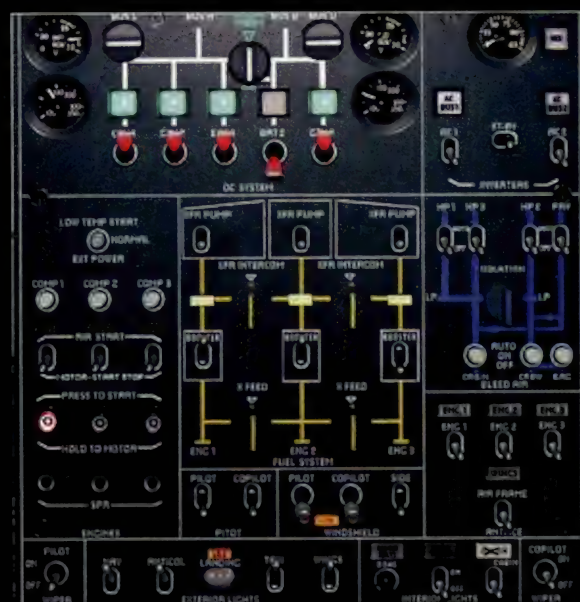
There's much to discover about the aircraft, but I'll mention that one of my favorite features is the animation of the landing gear. Most impressive is the articulation of the components so that the gear locking bars are the last to move into place when the gears are lowered and first to move when the gears are raised. Even the wheel wells are fully textured if you look at them from underneath. For another visual treat, look at the exterior during all parts of the day. We took a screenshot showing the Falcon airborne at dusk with downtown Chicago and Meigs Field visible under the aircraft.

Yannick also developed an innovative "executable manual," which is quite interesting to use. The graphical treatment of the manual seems based on the premise that "a picture is worth a thousand words," so you can learn about the aircraft and panel features with minimal text.

This is particularly helpful in learning about the radios, because they are the most complex I've seen in a flight simulator aircraft panel.

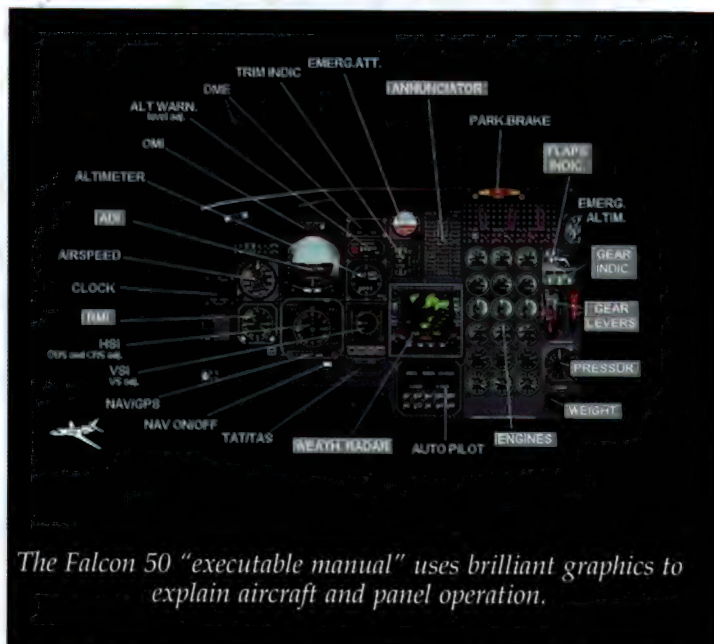


Falcon 50 center console and radios.



Falcon 50 upper panel, on which you can operate nearly every switch, light, and indicator.

As a brother who is a pilot and now captain on a Boeing 777, Yannick bought his first flight simulator because he was curious about his brother's job. He then developed a 777 aircraft with the help of his brother, and he did a Pilatus because he had the opportunity to use one during a full summer. Progressing through a Turbo Beaver whose owner helped, he's also had a good relationship with many aero clubs around Bordeaux. Certainly, after his previous successes, the Falcon 50 is a triumph.



The Falcon 50 "executable manual" uses brilliant graphics to explain aircraft and panel operation.



Fred Banting's panel has amazing detail in gauges and their operation.

The Instrument Panel

Fred Banting says that flight simming has been a hobby of his "since the dark ages of FS2." Having lived in and around the lake country of Ontario, Canada all his life, he says that bush planes like the Beaver, Otter, Norseman and others have been his primary interest, and he has done FS projects on several of these. He met Yannick a couple of years back through a DHC2 Beaver he was working on, and he has been involved in projects with him off and on since that time. When Fred saw an early preview of Yannick's Falcon 50, he says, "I could not resist, and it has

been a rewarding experience that has taken me into areas I had not been to before and fortunately, retirement has afforded me the time."

It's been time well spent because Fred's panel for the Falcon 50 is equal in quality and detail to Yannick's aircraft. The panel is from a vintage before full glass cockpits, and that's part of the joy of it, because the instruments are a mix of traditional gauges and electronic CRTs. I can't begin to count the operable features of the main panel gauges alone, and if you add in the upper panel and center console, there are many more, with almost everything being fully operable.

The upper panel can be used for automatic (**Ctrl + E**) or manual engine startup, accompanied by full animation and associated sounds. One realistic feature that Fred included during the engine starting procedure is how each engine slowly spools up before fuel is applied, after which it fires and "roars to life." In most other simulated panels, the engines spool up and start much too quickly.

The center console features a set of radios by Dai Griffiths, which are quite advanced. You need to look at the manual to fully understand these radios, because of their complexity. For example, not only can you "flip-flop" two radio frequencies; there is also a feature to store additional frequencies. There is a slight misalignment in reading some of the digits, but otherwise, the radio set is very impressive.

Flight Model

For several years, Rob Young has been developing improved flight models for the *Fly!* Series. He says, "this beautiful aircraft by Yannick Lavigne, the master FS designer, together with the wonderful custom gauges by Fred Banting, inspired me to 'come back' to FS2000." Certainly, we welcome him, because the aircraft flight model he has developed for the Falcon 50 is first class!

Rob tells us that FS flight modeling has been so full of frustrations and pitfalls, that this aircraft inspired him to "squeeze every drop of 'feel' and achievable performance accuracy within the restrictions of the MSFS flight engine." In particular, he wanted to overcome what in his opinion are big mistakes by others, especially for this kind of aircraft, in many other third-party FS aircraft flight models. These include vastly over-sensitive pitch and trim, rolling too quickly, spoilers too strong, ground brakes far too strong, reverse thrust too powerful, and a general "feel" of too stiff and lifeless.

Rob reminds us that in real jets, there is either actual or artificially built-in resistance (hydraulic damping) to moving the stick abruptly. He has tried to "emulate the feel of the airframe and wings resisting stick inputs - on the understanding that a flying machine weighing many tons only reluctantly moves from its current direction." In



*Top
Interior of the Falcon 50, which is zoomable all the way into the cockpit.*

*Bottom
About the only visual "bug" we found was this forward-left view from the cockpit, where an awkward piece of the fuselage is blocking the outside view.*

Consistent with their modesty, the authors have dedicated the project to Chuck Dome, whom they describe as "one of the main pioneers of flight simulator development, for his kindness and help (with special thanks for the weather radar)" and Louis Sinclair "whose FSDS program allows so much detail and quality when working on FS files."

In this same sharing spirit, the authors thoughtfully recognize and credit several others for additional contributions to this fine work:

Teammates at CAEA,
"who helped with testing, help and advice,"

Mike Crosthwaite
"for his great SDLEdit program,"

Arne Bartels
"who has done so much to bring the panel SDK into a form that is usable by mere mortals,"

Dai Griffiths
"for his 'Dragonflight' gauges and particularly his Collins Navpack,"

Peter Sidoli
"a vastly experienced corporate pilot, for air file testing,"

Tim Sanders
"Falcon 50 real motion simulator training captain, who provided the vital aircraft specifications and advice," and

Ron Freimuth
"Air file guru who helped Rob understand more parameters."

my view, he's accomplished this feat admirably, with the result that the aircraft is easily trimmed and smoothly controllable. Rob has also adjusted his "pet peeves" with other aircraft flight models, including appropriate pitch and roll sensitivity, ground brakes being more realistic, and providing appropriate reverse thrust. One result of this is that taxi speed is sustainable, as Rob says it should be, at a little above idle power. Overall, Rob has provided a great flight model!

Harrier Jump Jet

From Just Flight

Reviewed by Phil Paschutine

I believe it was Thomas Edison that said something like aviation not getting anywhere as long as aircraft wouldn't be able to fly like the hummingbird. To be able to take off, go up and down vertically, or go forward and backwards.

Harrier Jump Jet is another title in the steady stream of Just Flight pub add-ons. Just Flight keeps 'em coming faster than a pizzeria makes pizza! It can be installed for Microsoft Flight Simulator 2000, Combat Flight Simulator and Combat Flight Simulator 2.

What is the difference between a regular aircraft and a Harrier? Harriers have V/STOL ability, meaning they can Short Take Off and Land near vertically. In VTOL, the aircraft shares the same propulsion system for hover (vertical) and forward thrust. In the case of the Harrier VTOL is achieved by vectored thrust.



An AV8-A with nozzle mid position

Some V/STOL aircraft share a separate power plant for hover, as is the case of the Short Sc1 and Dassault Balzac V. Others share a combined power plant for hover, as seen in a Yak 38 and the McDonnell XV-1. The American and the French had found their own VSTOL research inconclusive and abandoned their projects.

The British carried on and were rewarded when the first of six production Harriers flew on August 31, 1966. Production began service on April 1, 1969. Its engine was a Bristol Pegasus Mk 101, with 19,000 lb of thrust. In 1969,

Conclusion

There's not much more to say, as I'm still a bit overwhelmed with the complexity of this project and the countless hours that the authors have spent. Yannick, Fred, and Rob were somewhat shy in providing a few personal details for this review, as I believe they truly work for the joy of our hobby, not personal recognition. However, we owe them abundant thanks and recognition.

I'll close by saying that this project is an example of some of the best of our flight simulation hobby – a collaborative project of an organization, three dedicated authors, and several other contributors, most of whom have met only electronically, and who have unselfishly produced and shared with the flight simulator community a great freeware achievement. Thanks to all!



(Above) Example of one of the instrument panels in Harrier Jump Jet

(Below) Landing on the HMS Fearless



G-VTOL - in flight

the USMC bought AV-8A Harriers, which used the 21,500 lb./thrust Pegasus 11 engine. In the early '80, the FRS1 Sea Harrier entered service with the Royal Navy.

There were other models, and the original aircraft now have changed and fitted with engines that are more powerful (achieving 23,800 lb thrust) and larger wings. This unique aircraft is in service in Spain, India, Italy, Thailand, GB and the USA. The British have slowed Harrier production, and are concentrating on the Eurofighter, the successor to the Harrier II.

Installation and documentation

We installed Harrier jump jet in both FS 2000 and CFS 2. We looked closely at five of the 22 aircraft, as well as the LCU (Landing Craft Unit) and the helicopter. The 68-page English/German manual has a description of each aircraft with specifications, model and panel features, along with an outside view and a cockpit view with legend. Panel-specific controls for all simulator versions are included. A short aircraft history is found at the end of the manual.

To use harrier Jump jet you need to click on its desktop icon. If you launch CFS2 the usual way, you will not be able to see the missions in the Campaign and Single Flights menus.

The aircraft

You cannot shoot in FS 2000 and will be able to do so only in CFS and CFS 2. In CFS2 you can choose when the aircraft uses "guns only", Rockets, and/or bombs. The real Harriers use other deadly weapons like air-to-air or air-to-ground guided missiles, but Flight Simulator and Combat flight simulator have their own limitations, so these are not included.

As is customary, all Just Flight aircraft add-ons are of the "fly and shoot" type. In short, only the primary instruments and guns are working. No moving levers or switches on the panels, but you can use the autopilot and NAV/COM/ADF panels in any of the simulator platforms.

The panels are unique for each aircraft. The gauges are not very readable on a 15' monitor, but the design is quite clear. In general, the panels are of average quality at best. The external colors on the planes are varied and the texture nicely applied. The Harrier has moving 3D thrust nozzles, retractable wing stabilizers and other animated surfaces.

You can perform three types of takeoffs: conventional, short roll and take off, and a "not quite VSTO." This is due to the limitations of the simulator. However, the very short take off roll is so short that you will not feel it. For take off a 120 meter runway is all you need. The Harrier's vertical take off procedure is easy: nozzles fully down, gradually apply full power, and then raise the nozzles in steps for

Product Reviews

smooth transition from vertical to horizontal flight. Remember to adjust back and forward stick pressure to keep the aircraft level when transiting.

In flight, the aircraft behaves very well and is maneuverable. Landing is quite an experience! You will have no trouble transiting from horizontal to vertical flight but you have to anticipate the final landing spot and change speeds as required, imagine trying to land when you cannot see in front of you.

The feeling of Hover is quite nicely achieved and remembering that even with the nozzles fully down you will have a slight forward speed, landing with these Harriers is like landing with a helicopter.

Of the 22 aircraft, only three have their own sound files. All Harrier sounds are based on the GR.3. The A-4P Skyhawk sound is based on the A-4Q Skyhawk. The Pucara has its own, as does the LCU. Concerning the LCU, some will question its usefulness.

Scenery and missions

There are a total of 20 missions, 10 involving the British and 10 for the Argentines. All recreate the Malvinas war in 1982. Since you may not be familiar with the area and the ships that participated in operations, each ship and field has a sort of homing NDB and VOR.

Admittedly, I died a hundred deaths! Anti-aircraft guns were responsible of my early demise. Airports are heavily protected and the air is filled with tracers when you dare fly near one. I was blown to cinder by a missile when my Pucara chased after a harrier. I have no shame in saying that I had to bail out several times. Vicious bunch of guys on both sides, they are, but the 1982 Malvinas conflict was a dirty little war.

Several airports are included. The scenery also includes the ships that participated in the Malvinas war. As a whole, the scenery is not at all inspiring, but it does include the ships that you can take off and land from. Note that HMS Invincible has a ski ramp.

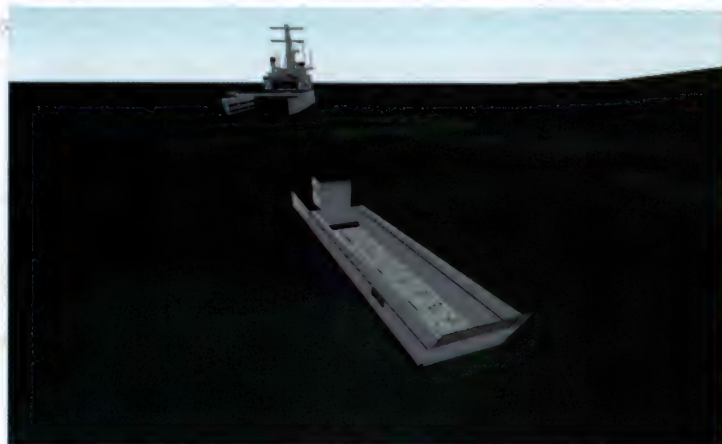
Be aware that if you load CFS 2 the normal way, you will not be able to see the name "Argentina" in the country field of the "Go To Airfields" menu. You must click on the add-on's desktop icon. This will call the CFS 2 exe and include the missions and campaigns. This is rather odd, and indicates that the design team is really not on top of the game.



Pucara in flight



Mirage Dagger in flight



Example of an LCU – basically FS 5 quality/technology in 3-D object creation.

Conclusion

Do not buy this add-on if you are looking for top quality add-on aircraft, panels, and scenery for Microsoft Flight Simulator or Combat Flight Simulator. Quite honestly, there is plenty of freeware out there of equal or better quality. You buy Harrier Jump Jet for the novelty of vertical takeoffs and landings, which adds a new and fun dimension to flying. If this is something you are looking for, then Harrier jump jet is a title you might enjoy.

For More Information

Publisher: Just Flight Limited

Email: orders@justflight.com

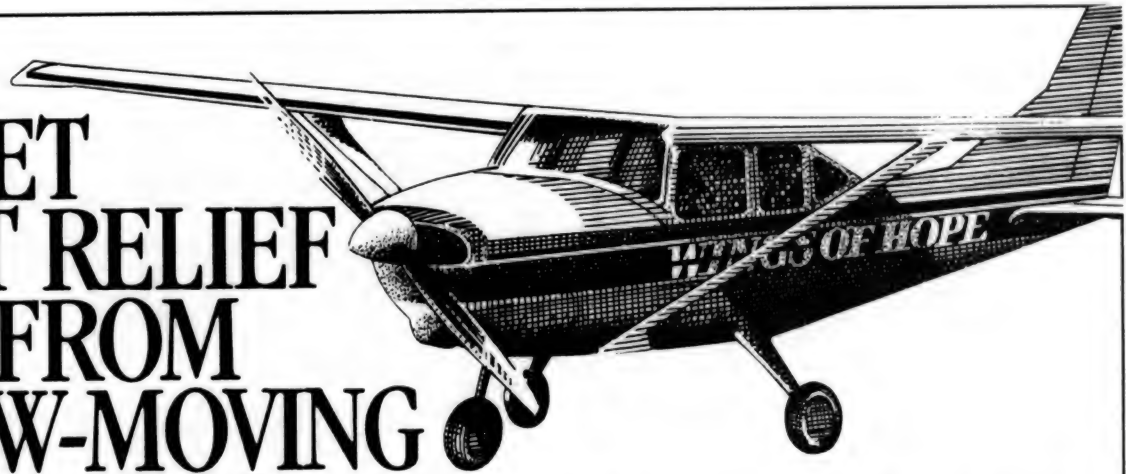
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The scenery is of minimal quality and detail at best as this example of Pebble Island demonstrates.

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Great Britain & Ireland

Scenery for Microsoft Flight Simulator 2000- From Just Flight

By Tim Dickens

Since the release of Microsoft Flight Simulator 2000 (FS 2000) almost two years ago, flight sim enthusiasts have had the opportunity to fully survey Great Britain, a country immensely rich in tradition with endless places to explore. This version of the simulator introduced almost all of the airports within the British Isles, in contrast to previous versions that offered almost nothing. But of course, the level of detail at almost all of these airports in FS 2000 is pretty much rudimentary.

Since FS 5 days we have been treated to quite a few add-on scenery projects for England, Scotland or Ireland, including many redundant versions of specific places like Gatwick and Heathrow. But, generally speaking, nothing had been attempted of the scope of Just Flight's *Great Britain & Ireland*, encompassing all of England, Scotland and Ireland in one shot. At least not since the days of FS 4 and 5.

Great Britain & Ireland is an airport upgrade scenery package for Flight Simulator 2000. It is intended to upgrade the default scenery, bringing the detail, texturing and 3D modeling of 280 of these airports to high-quality scenery design standards. It does not attempt to restructure the surrounding terrain because Microsoft did not make room in the scenery engine for aftermarket designers to do this. Microsoft's decision to do this has pretty much defined the practical latitude of all scenery design projects for FS 2000.

Let's look at this add-on package, and see what it has to offer.

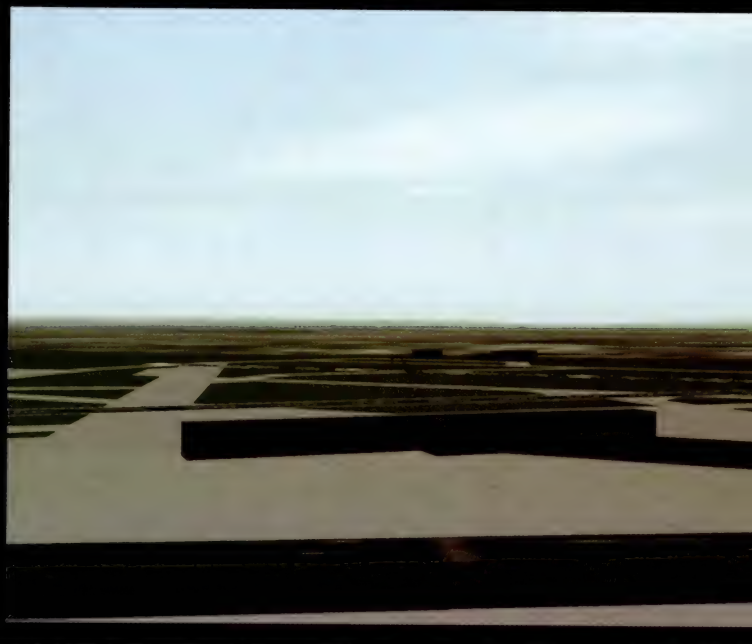
Installation and documentation

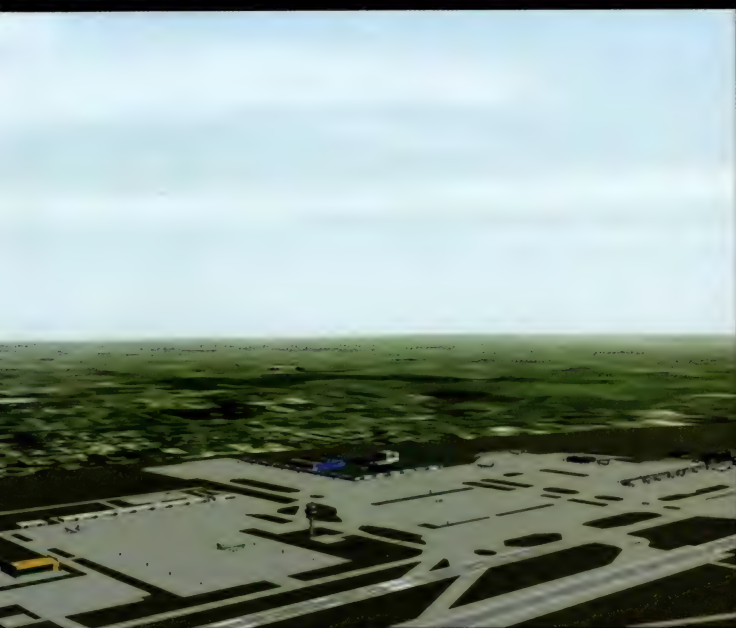
As is typically the case with Just Flight's add-on software, it comes very well packaged in a high quality box, along with the CD stored in a Jewel Case (I like this), and with a well-prepared printed manual.

Installation is accomplished through a Windows API driven install program, which worked flawlessly (I have no patience for add-on software that does *not* do this). The installation program also makes the necessary entries in the FS 2000 Scenery.cfg file, so you do not have to take any

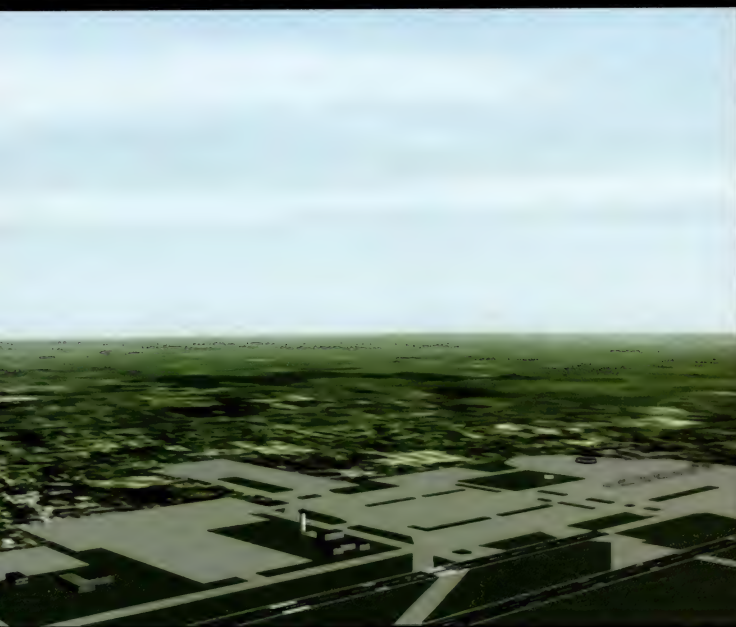


London Heathrow airport as rendered in Great Britain & Ireland (above) and Heathrow as rendered in the default FS 2000 scenery (below).



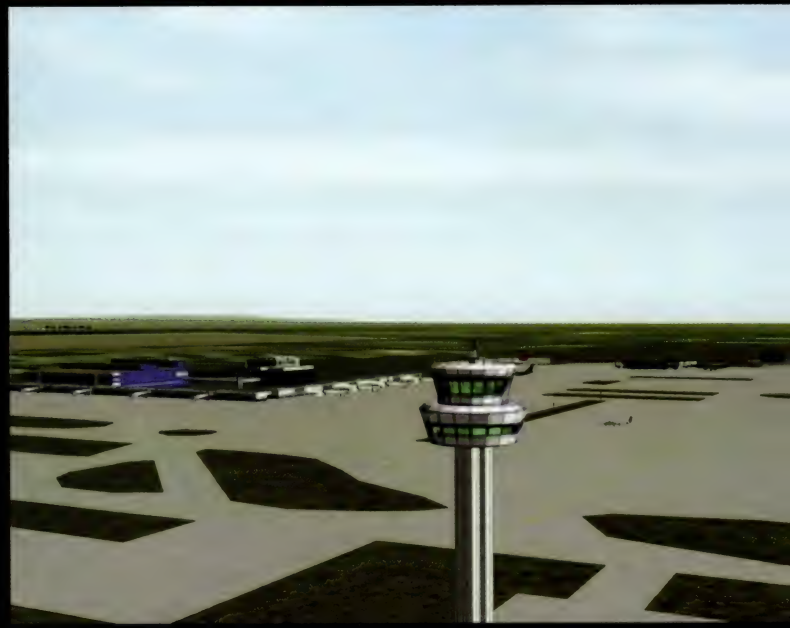


Gatwick airport as rendered in Great Britain & Ireland (above) and Gatwick as rendered in the default FS 2000 scenery (below).

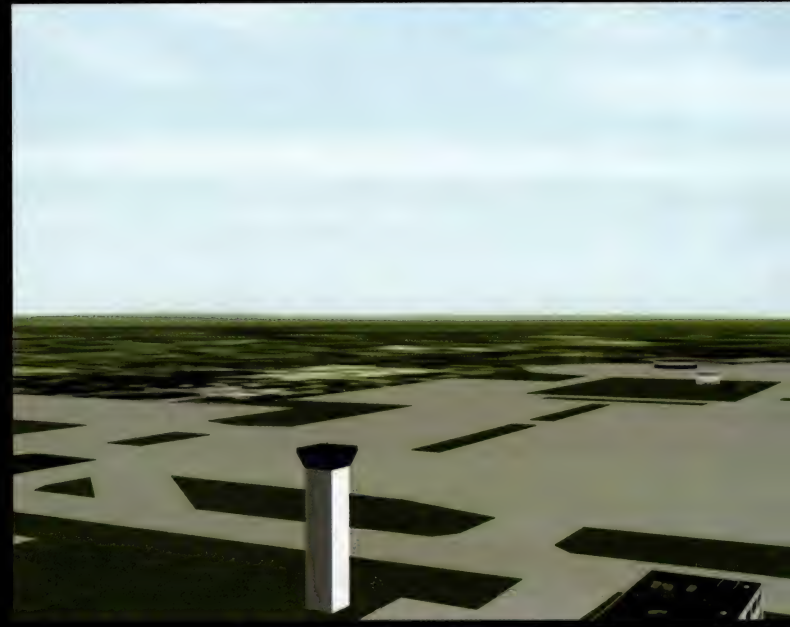


further steps to complete the scenery installation process. Likewise, I have no patience for add-ons that do *not* do this.

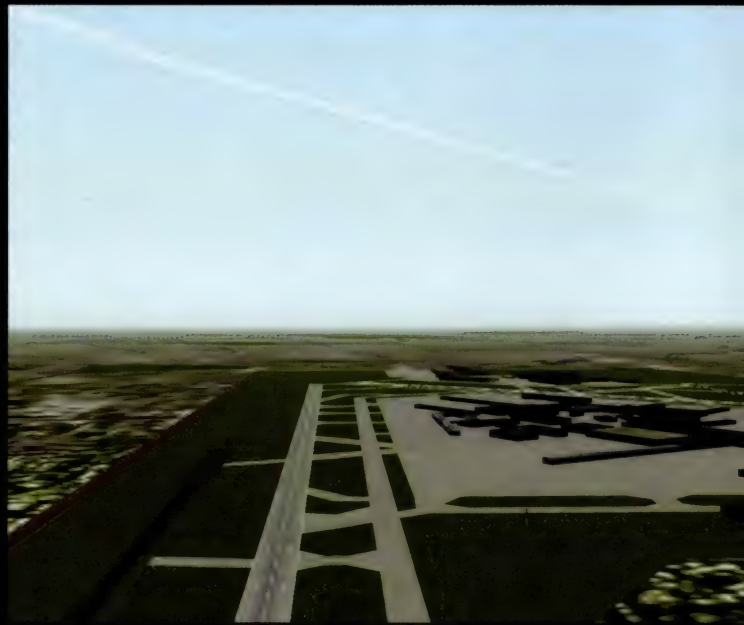
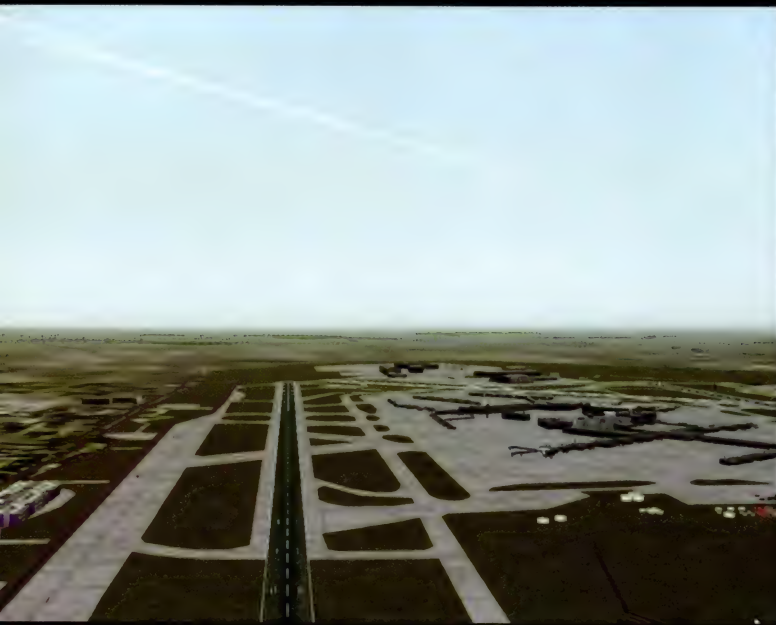
The installation program does give you the choice of which airports to install, which is a feature users will appreciate, rather than forcing the end-user to install all or nothing. "Our way or the highway" software installation is something else for which I have no tolerance.



Gatwick airport as rendered in Great Britain & Ireland (above) and Gatwick as rendered in the default FS 2000 scenery (below).



The printed manual contains information on how to carry out the installation process, how to uninstall the scenery, and how to modify the already installed features. It also provides users with basic instructions on how to access the new airports in their FS 2000 menu. Thereafter, the manual presents another 40 pages of basic data on the airports detailed in the package, including airport ID, latitude/longitude, altitude, ILS/runway frequencies (when applicable), runway IDs, and runway surface type.



Flying the scenery

Detailing 280 airports is an ambitious project to say the least. Clearly, the goal of such an add-on is to add realism and detail to the default airports already provided. That is why someone would purchase such a package, because although FS 2000 does provide (almost) all of the real-world runways to takeoff and land from, the default scenery provides little else. So, the point of an airport scenery add-on is to promote "the suspension of disbelief."

I think Great Britain & Ireland accomplishes this quite well. The screen captures we have chosen for this article illustrate what the default scenery and the enhanced scenery from Great Britain & Ireland look like, side by side, from the same viewing perspective. The difference in the level of detail is quite a contrast. Without a doubt, the enhanced scenery features a great deal of real-world detail, including renditions of the actual real-world structures, taxiway centerlines, jetways with working docking systems (where applicable), and static vehicles/aircraft.

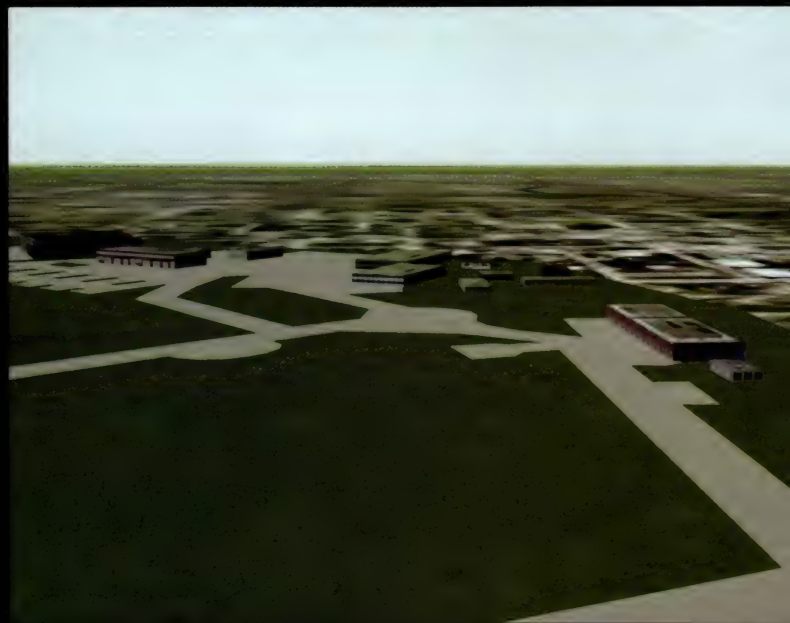
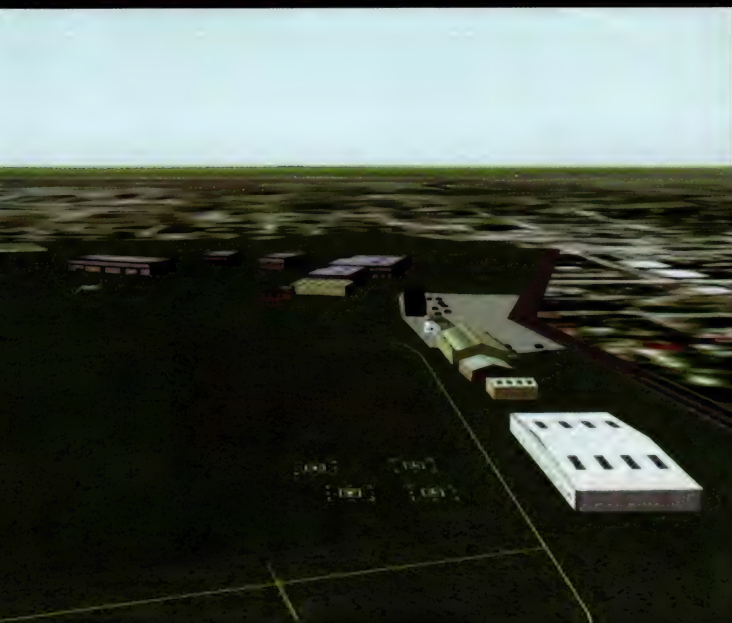
All of the airfields feature those "little extras" that good add-on scenery should have. Things like trees, beacons, cranes, and other objects that we take for granted when viewing a scene in real life, but are noticeably missing in a lot of flight simulation scenery. The taxiway texturing and aprons also represent a significant improvement over the default scenery. Not all of the airfields have the same level of detail, but this is not something I would even think of criticizing. 280 airports is one *very big* scenery project.

I think a few things could have been improved. For example, the airport layout is typically defined by a simple, multi-sided polygon. Much like that what you see in the



(Top images) Another example of London Heathrow airport as rendered in Great Britain & Ireland (left) and Heathrow as rendered in the default FS 2000 scenery (right).

(Left image) Custom 3D objects incorporating state-of-the-art FS 2000 Level scenery coding, such as night illumination effects.



Example of Cambridge airport as rendered in Great Britain & Ireland (left) and Cambridge as rendered in the default FS 2000 scenery (right).

default scenery, although applied with more care and a much more convincing texture. Also, I should point out that the authors did quite a good job of making the adjoining roads and infrastructure match the airport layout, which creates a much more convincing scene when approaching the airport.

But the biggest objection would have to be in the area of display performance. The frame rates do take a *very serious* hit when this scenery is loaded. Even when tested on a high-end machine, in this case a 1.3 GHz CPU system, with 512 MB of RAM, and with a GeForce 2 Ultra video card. Even with this much muscle, the display was slowed down to 6 frames/sec. at Heathrow, for example. Fortunately, it is possible to achieve a higher performance level by reducing the scenery complexity slider in the simulator. However, I think much more could be done to improve scenery performance at some of the airports.

Conclusion

The bottom line on Great Britain & Ireland is that it is well worth the money. At a price that works out roughly to be \$17.00 you get 280 detailed airports. That is quite a value.

Considering the scope of the project, the quality of the scenery is quite good. There are some performance issues, but at least the designers formatted their scenery properly, so that a reduced number of 3D objects are loaded at lower scenery complexity levels, which boost the frame rates.

If virtual aviation in the British Isles is something that interests you, then you should seriously consider getting Great Britain & Ireland. It is well worth the money.

For More Information

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SRP : £24.99 (about \$17.00 US)

Korean Combat Pilot

Scenery, Aircraft & Missions for Microsoft Combat Flight Simulator from Just Flight

Reviewed by Phil Paschutine

The Korean War is one in which jets were opposed to jets and to W.W.II aircraft. Not many "young" Europeans are familiar with the Korean conflict, a.k.a. "the Forgotten War."

It all started on August 9, 1945 when the Soviets invaded and kicked the Japanese occupation forces out of Manchuria. On August 15th, Korea was split into two occupation zones along the 38th parallel, Soviets to the North and US in the South. On September 8th 1945 the US occupation force landed at Inchon.

Several volumes are needed to detail 1946 to 1948. From 1948 to 1950, there were clashes between the North and South borders. On June 29th 1949, the last US military left South Korea. In 1950 North Korea invaded South Korea and captured Seoul on June 29th. The war raged on until July 27th 1953. Some of our famous people like John Glenn, Buzz Aldrin and Ted Williams were pilots during the Korean conflicts.

Korean Combat Pilot, although not a "historical add-on," is intended as a reminder that this was just as bloody a war as W.W.II and Vietnam. Let's look and see how well it carries out its mission.

Installation and documentation

Korean combat Pilot automatically installs to either Microsoft Combat Flight Simulator (CFS) or Combat Flight Simulator 2 (CFS 2). The 88-page English/German manual begins with a brief background history of the



(Top) Bell 47 – outside view and extra panels

(Center) North American F-51D Mustang South Korean Air Force

(Bottom) North American F-86F Sabre. F-86F

Korean conflict. You will also see notes on weapon use for both versions of CFS.

An alphabetical description of each aircraft with specifications and history, model and panel controls along with an outside view and a cockpit view with legend. Finally, you'll find mission details.

The aircraft

Korean Combat Pilot offers thirteen aircraft -half W.W.II aircraft and modern jets, and a helicopter.

- ➔ Boeing B29
- ➔ Bell H-13B Sioux (Bell 47) Helicopter
- ➔ North American F-51D Mustang in South Korean Air Force colors
- ➔ Lockheed F-80 Shooting Star
- ➔ North American F-86F Sabre.
- ➔ Fairey Firefly FR.5 in Royal Australian Navy colors
- ➔ Grumman F9F-5 Panther
- ➔ Hawker Sea Fury Mk.II in Royal Navy colors
- ➔ Ilyushin Il-10 Sturmovik ground attacker
- ➔ Mikoyan-Gurevich MiG-15 in China Air Forces colors
- ➔ Mikoyan-Gurevich MiG-15 in Korean Air Forces colors
- ➔ Mikoyan-Gurevich MiG-15 in Soviet Air Force colors
- ➔ Vought F4U-5N Corsair
- ➔ Yakovlev Yak-9 fighter

A "trademark" of the Just Flight aircraft add-ons is "shoot and fly" so by choice, cockpits do not have a full compliment of working gauges, or functional switches. Expect only the primary instruments and weapons. The throttle, the A/P and NAV/COM/ADF can be displayed as pop-ups. So as is the case with many of the add-ons for Just Flight, we only say that there are certainly much better panels available in contemporary commercial and freeware releases.



Hawker Sea Fury Mk.II Royal Navy and cockpit (inset).



Mikoyan-Gurevich MiG-15 korea and cockpit (inset).



The aircraft skin textures of author Shigeru Tanaka are quite cartoonish in my opinion. As always, some will complain and some will love them. I have grown accustomed to them and will at times feel like I am flying in a comic book environment.

If you were a fan of M.A.S.H., there is a Bell H13-B Sioux helicopter like the one used in that movie/TV series. I wish they had also built the 4077th MASH compound as we know it.

The other aircraft have individual panels, animated 3D wheels, and flaps that are animated, but not in 3D. Great care has been put into the sound files. If you like authentic sounds, you will surely appreciate the fact that 12 out of the 14 aircraft having their own unique sound files.

The missions

There are 21 missions, combining air-t-air and air-to-ground scenarios. Ten on the side of the Korean forces, eight for the USA, and two for the British. Missions will make you break out into a sweat and you had better watch out for murderous flak.

There are two campaigns, one for each side. Single missions were based on actual events such as the first encounter with the Mig 15s over the Yalu border. The M.A.S.H. mission is a must. You can relive what you've seen on TV for so many years. However, be careful of the helo! That Bell is capricious and requires an experienced pilot. The power plant strike is the incarnation of "hell on earth." Although I managed to get in a few rockets, either it was a direct hit or the flak, but something hit my coolant reservoir and I died at 33% of the mission.

If you think you are alone in the skies, forget it! Wingman issuing warnings or positions, another pilot saying he was hit; a lot of vocals and flak to divert the attention, a very deadly combination. The few missions I have tried did not reveal any major flaws and proved to be quite realistic and unfortunately for me, deadly.

Since you will certainly want to fly the missions and campaigns, you will need to click on the "KCP - CFS2" desktop icon. If you launch CFS2 the usual way, you will not be able to see the missions in the Campaign and Single Flights menus. This is really not up to current add-on software standards for CFS and CFS 2, and is rather disappointing.

Scenery

Regrettably, not much of it, and nothing that really stands out. Pyong, Seoul and Kimpo are rendered, and that's about it. There are many dynamics objects, such as ships, and static trucks, tents, and hangers, which can only be seen in mission mode. So, you do have plenty of things at which to shoot.

Product Reviews

Conclusion

If your main interest is in adding some action for this period of history to your Combat Flight Simulator experience, with plenty of action filled missions to fly, then this is a package you will want to consider. If up to date and top quality add-on scenery, aircraft and panels are important to you, it is not. That's the bottom line.

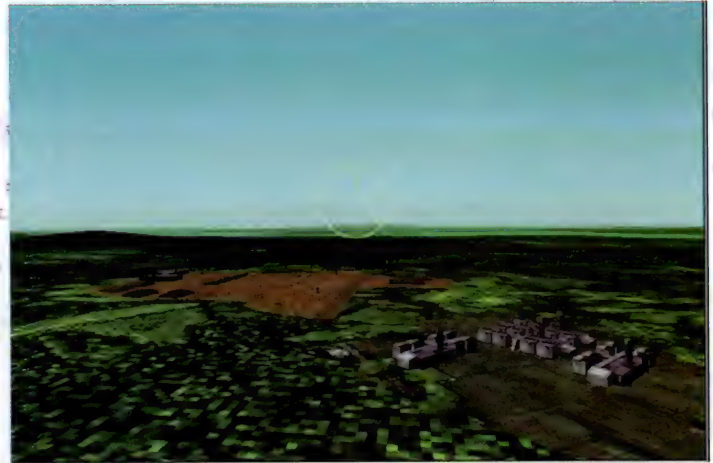
For More Information

Publisher: Just Flight Ltd

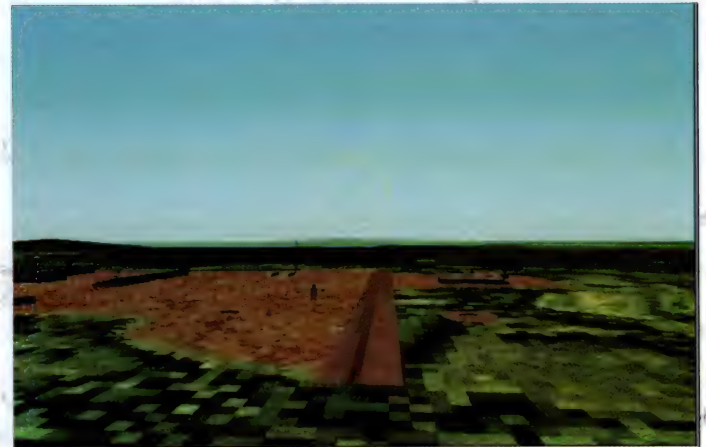
Email: orders@justflight.com

Website: <http://www.justflight.com/>

SRP: £24.99 (about \$17.00)



Kimpo Air Base in Korean Combat Pilot
(above and below)



They Said It or Did It!

When officials in one city sought champagne in 1927 to welcome aviator Charles Lindbergh back after his historic transatlantic flight, they were told by a tavern keeper that the sale would be illegal unless medicinal or religious need was shown.

After securing vouchers provided by several churches, police officers returned a little later for the champagne.

"The use of aircraft over water has much to be said for it. They present, however, one tremendous difficulty. To get off the ground with the weight of passengers, freight, mail and fuel with which they would be loaded requires a landing field of gargantuan proportions. Certainly there are no fields today in either the U.S. or Europe which could accommodate such a plane. And it may be impracticable ever to build them."

Forbes Magazine, July 1, 1938

"Men will never fly, because flying is reserved for angels."

Episcopalian Bishop Milton Wright (father of Orville and Wilbur)

"All attempts at artificial aviation are not only dangerous to human life, but foredoomed to failure from the engineering standpoint."

Simon Newcomb, American Astronomer in 1906 three years after the flight at Kitty Hawk.

Preview 44th Paris Air Show

What To Expect

There will be 242 aircraft (204 in '99) on static display. Out of those aircraft, 65 will do various in-flight demonstrations; I'll do my very best to hitch more rides this year.

New civilian and military aircraft and even a new Zeppelin are expected to make an appearance. The new civilian aircraft will be the Airbus A340-600, Boeing 737-900 and deluxe versions of the A319 and B337. Bombardier is coming with its 68 pax CRJ 700. Tupolev will display for the first time its Tu334. Italy will display and demonstrate its military twin engined air transport C27J.

Brazil's Embraer ERJ 190 will be only on static display as will China's FC 1 combat aircraft based on the Mig 33 and the M 28 Bryz: Poland's latest Maritime patrol and recon aircraft based on the An28.

Singles engines will be represented as well: TB 200, TB20 Trinidad GT, TB9 Tampico GT and others.

Drones, such as the Global Hawk and the first parts of the mammoth A380, will also be on static display. I can't wait to see the Mirage 2000 D, Rafale, Sukhoi- Su30Mk, F16 and F18F do their stuff. Of course, Gripen, the Eurofighter, Mig AT and the AMX will try to steal the show! I intend on testing all the military simulators and a Falcon 50 simulator built by a group of dedicated French flight simmers.

I'm not sure if six days will be enough. Did I mention a 75 meter long Zeppelin LZ N07...and let's not forget the An124 and AN225. So many airplanes and so short a time.

On The Ground

The global solution pavilion in Hall 1 will group international professionals by activity. This year's themes are Space and Communication, Telecommunication, new metal for the millenium, aircraft comfort and exec aircrafts. The Paris Air Show will also be held in several important places in Paris with static displays representing French aeronautical activity.

The photos on these pages are meant only to whet your appetites. I'm currently sorting some 400+ photos and will bring you the full report in an upcoming issue of Flight Simulator World. Along with the novelties, I have focused on the military simulators (Mako, Mirage 2000, BAE Hawk Lift, Gripen), the civilians simulators (Goddrich Smart Deck) and a superb Falcon 50 full deck simulator built by a group of dedicated French flight simmers.

I'll show you the inside of the mammoth C17 and some in-flight photos of the new A340-600. I tried anti-smoke security systems and let me tell you that a smoked out cockpit is one scary experience, but I soon was able to see the main instruments but more on that later.



I briefly met Konstatin Kukushkin (at left), the man who brings you many fine add-ons published by Abacus.



French Président Jacques Chirac came for a few minutes on the Tuesday. I felt sorry for him because they presented the whole two hour show in some 20 minutes so he missed quite a bit. As for myself and the photographers, we were on the premises every day at 7:00 AM sharp.

by Phil Paschutine



We did not want to miss a beat or weirdoes dressed up as Top Gun pilots with very thick glasses. The variant this year was phony security/SWAT people.. Too bad for them, the real security people had standard type earplugs and the phonies had their mobile phone earplug stuck up their ears.



French President and Serge Dassault (far left)

The game was to point them out in public and yell, "here goes another phony, look at him!" As for the guy with thick glasses, we encircled him and laughed all we could.. Not very charitable I know but that's how it goes.



The new A340-600



The Goodrich Smart Deck



Mako simulator



Pre simulation briefing on the Mirage 2000-5 Mk2 simulator

Stay tuned for an exciting account of the 44th Paris Air Show in an upcoming issue!

Photo credits: J-C. Gicquel, P. Lang, C. Le Berre, F.Leriche, JP. Martinho, L.Rocheron

Web Watch

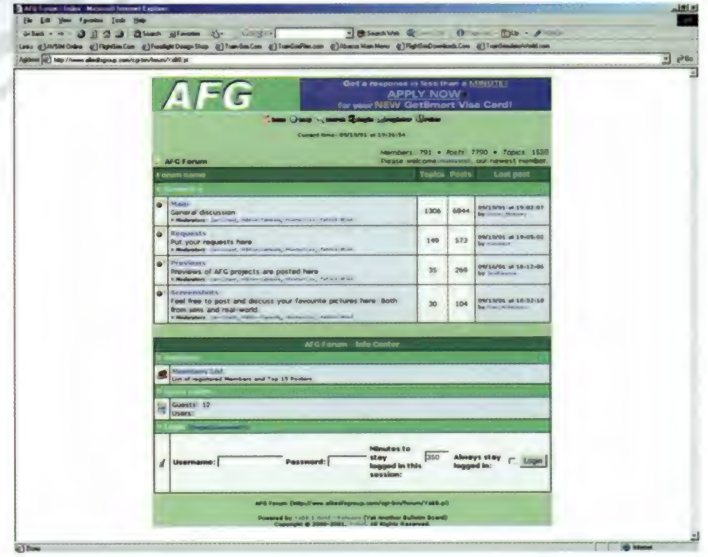
Welcome, passengers to your flight around the World Wide Web! As you take your seats, the flight attendant will go through the safety procedures for your connecting flight to the Internet and will point out the monitor in front of you for your journey. Today we will visit some great FS related freeware download sites and we'll make a brief visit to some of those old favorites.

Allied FS Group (AFG)

Our first stop today brings us to <http://www.alliedfsgroup.com>. The Allied FS Group (AFG) is a combination of some of the best aircraft designers in world who put their talents together to deliver some of the best freeware aircraft available.

The AFG site has a good selection of A-340s, MD-80s, MD-90s, DC-9s and ART-72s available for download. Each model is rather superior to those you typically find on a freeware site. You can click on a thumbnail of each aircraft and get an up-close view of each aircraft opened in a separate window. The aircraft can be sorted by the type of aircraft (Airbus, MD-80, MD-90 and so on) or by Airline name.





Along with the great quality aircraft, you can also join in a discussion in the Forum and even sign up for their newsletter. All you need to do to sign up is give them your e-mail address!

The AFG site also includes a poll that gives you the results from hundreds of visitors concerning several FS related questions. It can be useful to help you determine where you stand in the FS community. You can also take a great quiz, the winner of which receives a nice prize!

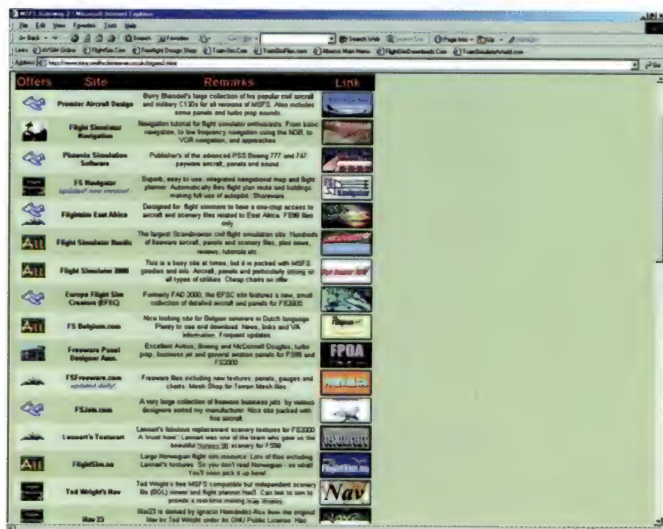
The only downside I found to the site was that they had a spot to download panels and sounds and only one panel and one sound set is listed. It would be nice to have a few other choices to go with the detailed aircraft.

MSFS Gateway

Our next stop is short, but sweet. Tune in NAV1 to <http://www.tony.smiths.btinternet.co.uk/fsgate1.html>. This is the MSFS Gateway (MSFS is of course Microsoft Flight Simulator).



This is a lengthy page with currently eight pages of FS related links. The pages do not seem to be sorted alphabetically like you'd think, but it does have a very extensive set of links with good descriptions of the sites as well.



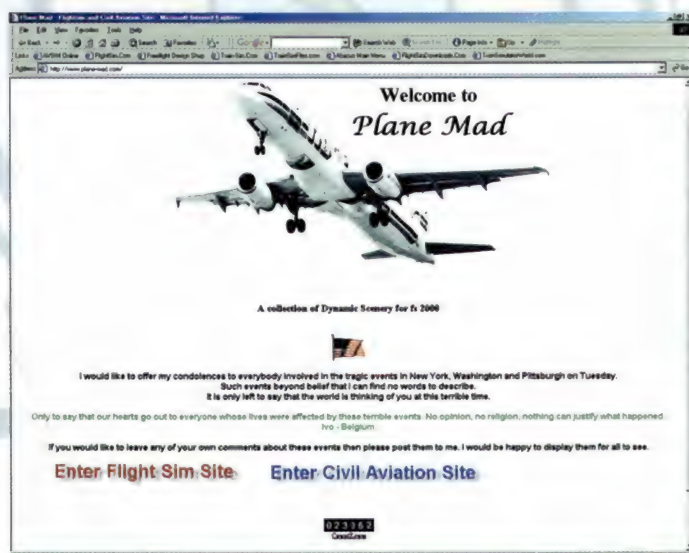
The last page on the MSFS Gateway gives links to the Virtual Airlines. At the time I wrote this, there were about 46 different VAs listed.

On a few of the pages including the first and last page, you will find a link to the X-Plane Gateway (<http://www.tony.smiths.btinternet.co.uk/xpgate1.html>). This page is similar to the MSFS Gateway with the difference being it gives links to X-Plane related sites.

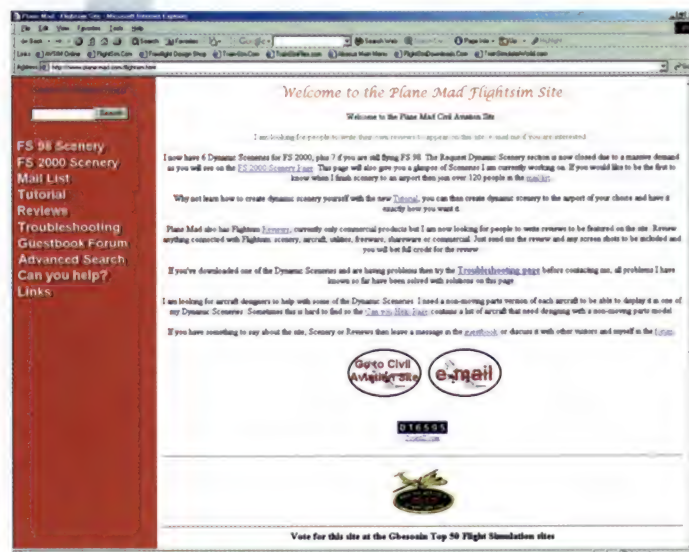


Plane-Mad

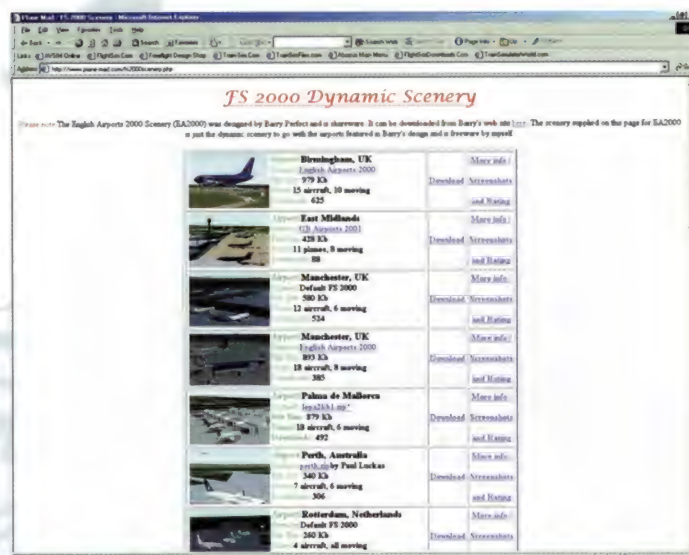
Our next site brings us to <http://www.plane-mad.com>. This site specializes in Dynamic Scenery for FS98 and FS2000.



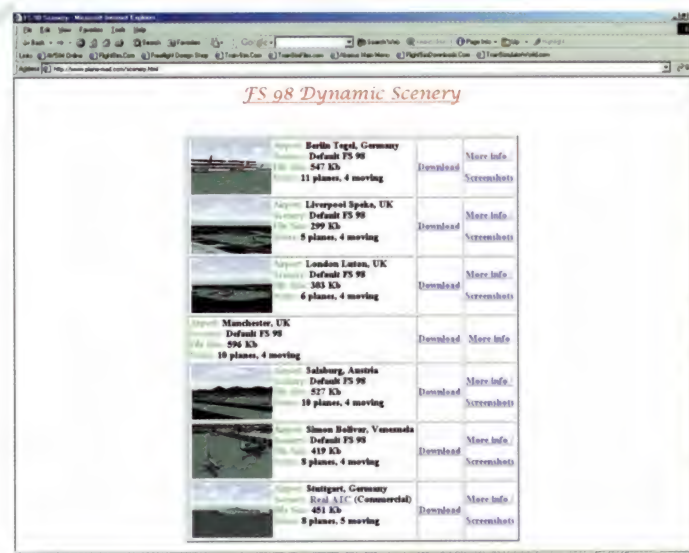
For those not familiar with the term, Dynamic Scenery refers to the moving objects within Flight Sim (Meigs Field has some Dynamic Scenery if it is turned on).



The scenery is setup in two main sections – FS98 and FS2000. Each download comes with instructions on how to set it up in your Flight Sim.



If you are stuck with any of the scenery, you can visit the troubleshooting section of the site for assistance.

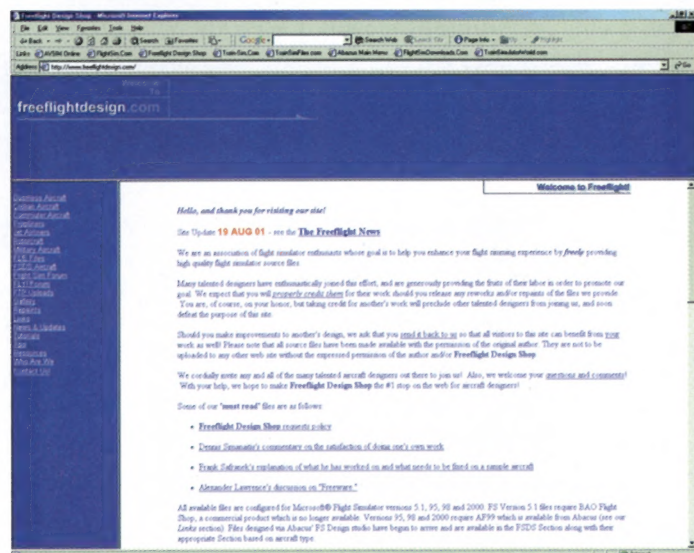


The bulk of the Dynamic Scenery is for Non-U.S. airports including Birmingham and Manchester in the U.K., Rotterdam in the Netherlands, Perth in Australia and more.

Revisiting Old Friends

Freeflight Design

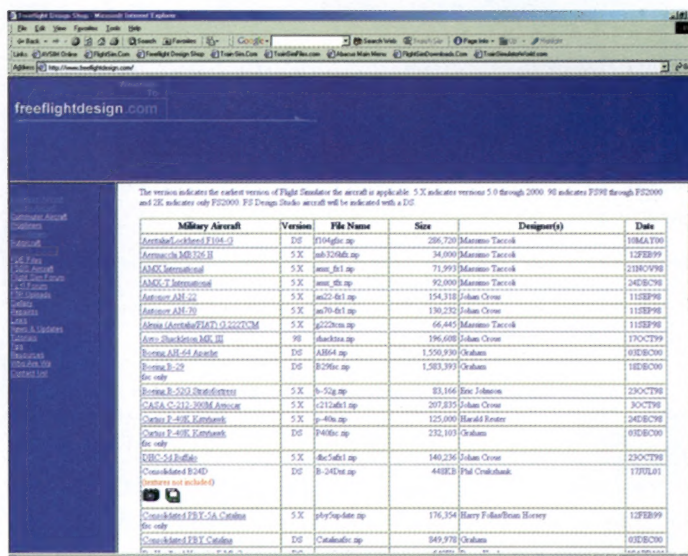
I would like to visit some of the Flight Sim websites that have been around for quite a while and who have helped make Flight Sim a genuine hobby. We start with a visit to <http://www.freeflightdesign.com>.



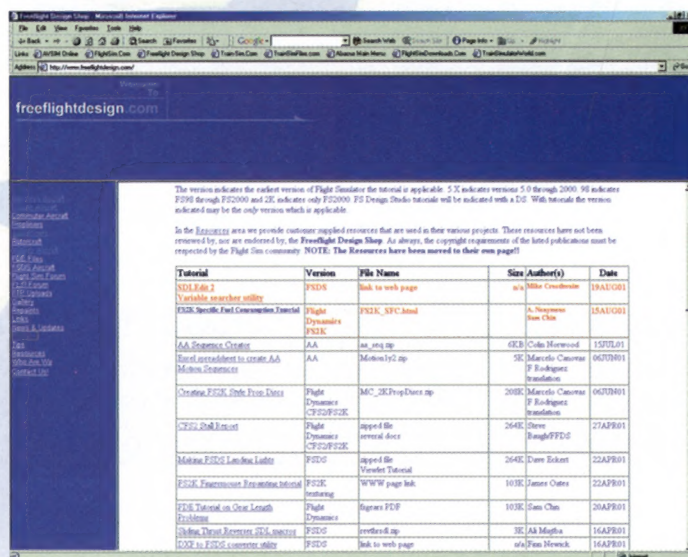
Free Flight Design is a site that allows anyone to download aircraft source files including AFX files for use with Aircraft Factory 99 and FSC files for use with FS Design Studio Pro.

All files are provided freely as long as credit is given to the original author. The site is broken down into different types of aircraft including Business, Civilian, Military and Commuter Aircraft, Propellers, Jet Airliners and Rotocraft (helicopters mainly).

Each listing shows the author's name, which version of FS or design tool was used and is required, the size of the download and the date it was posted.



The site also includes FDE files (Air files that determine how the plane flies in FS), FSDS Aircraft (FS Design Studio Aircraft), repaints, a Flight Sim Forum (very popular) and much more.

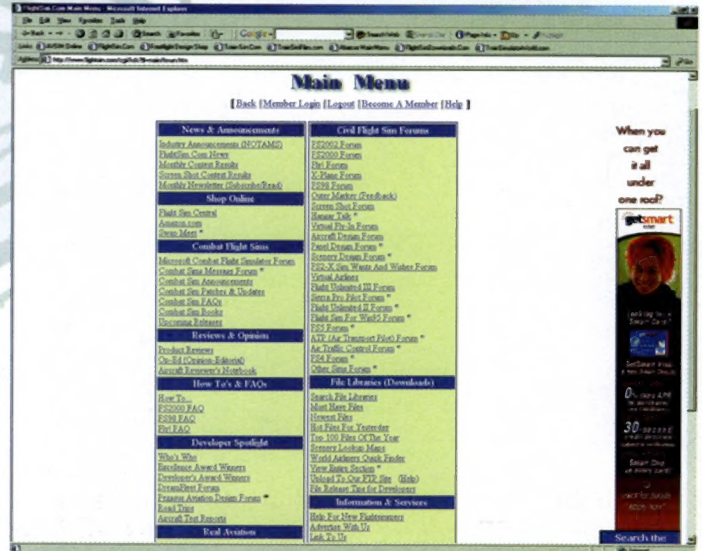


Flightsim.com

Our last stop on our journey will bring us to <http://www.flightsim.com>. This site has been a mainstay of mine for years and will continue to be. Just about every file of any kind makes its way to this site for public download.



The main page will keep you up to date on the latest information from the Flight Sim community and the Main Menu will give you what you want. The most popular portions of the site, besides the main page, are the Search File Libraries, the How To... section and the various Forums. Many sections of FlighthSim.com do require a login in ID and Password, but you can sign up for free. TO guarantee access, you can purchase a First Class Membership, which will get you in to the 'secure' areas every time.



I hope you have enjoyed your journey today! If you have a favorite website, or if you run a Flight Sim related website that you would like to see mentioned WebWatch, drop me a line at: adam@flightsimulatorworld.com and I will be happy to include it!



Six great carrier-based planes challenge you to set 'er down on a short, narrow moving target.

The package includes U.S.S. Nimitz in great detail and six aircraft (F/A-18C Hornet, F-14D Tomcat, A-7E Corsair, TA-4J Skyhawk, S-3 Viking & E2C Hawkeye).

Carrier-based flight tests your piloting skills unlike any other flying that you're ever likely to encounter. Are you up to the challenge? This impressive fleet of *Flight Deck II* aircraft keeps you on the edge of your seat!

1-55755-446-3 \$29.95



During World War II, the Catalina served as an intelligence-gathering aircraft. But it also served in search and rescue missions and performed small bombing raids as well. The *Legends of Aviation Series* pays tribute to these monuments of aviation with four authentic versions of this impressive aircraft: a land-based civilian model, a water-based civilian model as well as both a land and sea version of the military Catalina.

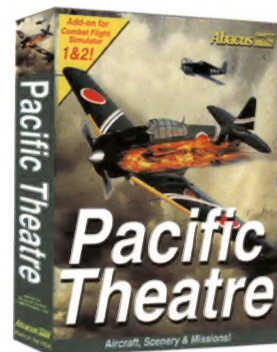
The Princess is visually breathtaking. The developers mastered special techniques such as shining landing lights, silky-smooth landing gear motion, working wipers and fully-functional custom instrumentation!

1-55755-441-2 \$29.95

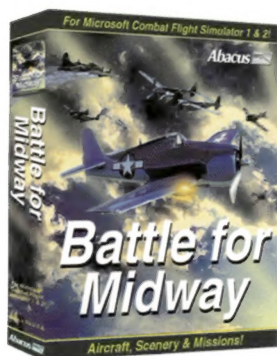
Pacific Theatre add-on brings you twelve of the most famous U.S. and Japanese planes that saw battle in the Pacific. These authentic planes were created especially for CFS by designers Terry Hill and Dennis Wasnich.

Pacific Theatre add-on brings you the Hawaiian Islands where the war in the Pacific first started- Pearl Harbor. The missions and battle scenes have been laid out according to historical records such as these.

An add-on package for Combat Flight Simulator wouldn't be complete without missions. The *Pacific Theatre* missions were created based on actual events at Pearl Harbor in 1941.



1-55755-447-1 \$29.95



Battle for Midway features ten of the most famous U.S. and Japanese planes used in the Midway and Coral Sea areas, as well as two bonus planes- the twin-tailed P-28 Lightning and J7W Shinden "pusher." The *Battle for Midway* missions based on actual events of the Coral Sea and Midway Islands in 1942.

You'll fly in the uncharted skies to face a relentless enemy. The exploding "mission objects" are finely crafted 3-D enhancements that behave as you'd expect them to in combat, exploding when hit with artillery fire!

1-55755-445-5 \$29.95



Abacus has several best-selling add-ons for Microsoft Combat Flight Simulator, which shows our commitment to this popular and flexible platform. The aircraft in *Pacific Theatre*, *Battle for Midway*, *Wings Over China* and *Tuskegee Fighters* are among the most famous of World War II.

We've taken the best of these warbirds, all crafted by noted designer Terry Hill and put them into *Combat Squadron*, which will give you 18 great planes for CFS2, CFS 1 and FS2000!

1-55755-440-4 \$29.95



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CH Pro Pedals	\$89.95
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NOTAM: All customers who purchase Fly to Hawaii for Flight Simulator 2000 will receive a Fly to Hawaii for Flight Simulator 2002 Upgrade CD-ROM from the publisher - ABSOLUTELY FREE!



FLY TO HAWAII

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Each control module is a separate USB device with a simple Plug and Play connection to your computer, and configured using GoFlight's easy-to-use GFCConfig software.



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FLIGHT SIMULATOR 2002

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The result of ThrustMaster's close collaboration with the United States Air Force, this latest HOTAS Cougar (Hands on Throttle and Stick) system offers the best in high-end flight sim equipment.

The ThrustMaster HOTAS Cougar is a two part system - the stick and the throttle - and come complete with a removable handle for future upgrades. The system is USB and comes with easy connections for the stick, throttle, and all compatible analog rudders.

The joystick includes a metal die-cast base, handle, buttons, and gimbals offering durability that can last throughout any gaming experience and is an F-16 fighter controller replica



TM HOTAS COUGAR

CALL!

Look Ma, No Keys!

This is the one you've been waiting for! Sporting combat features to allow the new CH Pro Throttle USB to excel at flight sims, the new Pro Throttle features a mode switch to allow three defined sets that can be switched on the fly. An LED light array to show the user which button set he or she has loaded: Regular, Combat, or Advanced mode. A mini joystick is mounted for control with the thumb to allow advanced targeting. 360-degree view control, an excellent tool for racking up the "frags" in first person shooting games. The new CH Pro Throttle USB is the meanest tool for combat/flight simulation produced by CH Products to date!



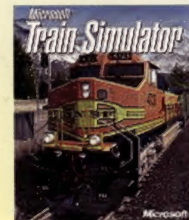
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